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Vol. XXXVI No. 5

Biological
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ALBANY MEDICAL ANNALS

Journal of the Alumni Association of the
Albany Medical College

MAY, 1915

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ALBANY MEDICAL ANNALS

Journal of the Alumni Association of the Albany Medical College

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A. VANDER VEER, M. D. W. G. TUCKER, M. D. ANDREW MACFARLANE, M. D.

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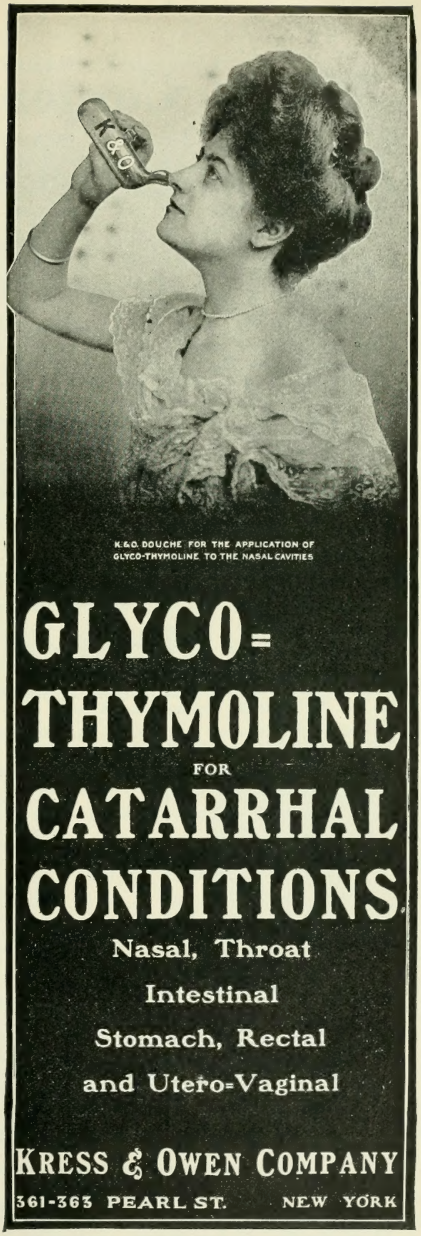

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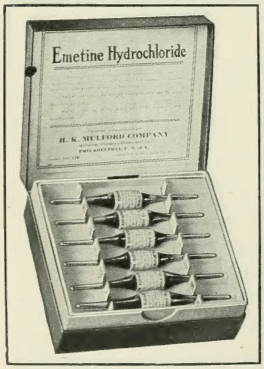

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* New York Medical Journal, July 4, 1914.

† New Orleans Medical and Surgical Journal, August, 1914; Dental Cosmos, December, 1914.

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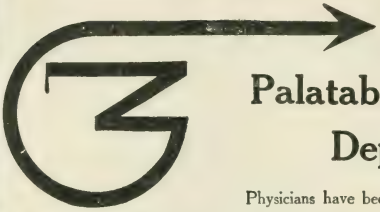

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VOL. XXXVI MAY, 1915 No. 5

ALBANY MEDICAL ANNALS

Original Communications

THE DIAGNOSIS OF CEREBRAL TUMOR.

Read before the Medical Society of the County of Albany, February 12, 1915.

BY LA SALLE ARCHAMBAULT, M. D.,
Professor of Neurology in the Albany Medical College, Albany, N. Y.

In order to arrive at an early diagnosis of cerebral tumor, an accurate knowledge and a correct interpretation of its symptoms are indispensable. While it would be superfluous to discuss at length the various symptoms of tumor of the brain, a general survey of their evolution and a brief reference to the clinical significance of some of them cannot well be omitted. In rare cases a cerebral tumor may be so situated as to give rise to no symptoms whatever and be discovered with surprise at the autopsy. This is exceptional, however, and in the vast majority of cases the symptoms appear early and soon give evidence of severe cerebral disorder.

The symptoms of cerebral tumor may be divided into (*a*) general symptoms common to all varieties and to all localizations, and (*b*) local symptoms which vary with the situation of the tumor.

The general symptoms are headache, vertigo and vomiting, psychic changes, convulsive seizures, disordered pulse and respiration and changes in the eye-grounds, more particularly choked disc. While we believe that most, if not all, of these general symptoms are due to increased intracranial tension or to associated internal hydrocephalus, none of them with the possible exception of choked disc is pathognomonic of cerebral tumor or even of hypertension. They occur in so many other diseases of the brain, both organic and functional, that they possess in themselves little if any diagnostic significance and furnish no clue

whatever as to the nature of the underlying lesion. Choked disc, however, may justly be regarded as the signature of intracranial hypertension and indicates, in ninety per cent. of cases, cerebral tumor. Conversely, it may be stated that according to the most eminent clinicians, choked disc is present in ninety per cent. of cases of cerebral tumor. Unfortunately it must be admitted that when a definite choked disc becomes apparent, the causative tumor has either already attained considerable proportions or determined an equally deleterious ventricular distention. It is therefore highly important to establish a diagnosis of cerebral tumor before choked disc becomes well marked, and yet this is often rendered difficult by the fact that, in many cases, visual acuity is retained even when the process has reached an advanced stage, so that the eye lesion does not always betray itself by a corresponding functional deficit. If it were otherwise, we could count upon the ophthalmologist for a larger percentage of timely interventions. In this connection, it is important to recall that while choked disc is usually bilateral, it is frequently unilateral at the very start and may even remain so during an appreciable period. Inasmuch as in such a case the process is almost invariably situated on the same side as the tumor, it constitutes an exceptionally valuable sign since it not only affords an opportunity of intervening before generalized compression has occurred, but likewise serves, in a certain measure, the purpose of a localizing factor. A great advance would be realized if it were possible to sufficiently impress the general practitioner with the necessity and importance of careful perimetric examinations in all cases of suspected organic brain disease. It was shown by Harvey Cushing in 1909 that inversion or interlacing of the color-fields, not unlike that which occurs in hysteria, is a very common if not a usual phenomenon in the evolution of brain tumor, and, furthermore, that it is an early sign of intracranial tension and often becomes manifest long before choked disc can be recognized. Naturally the detection of such perimetric deviations or of beginning or unilateral choked disc represents the most precious means of establishing, when other factors are present, an early and positive diagnosis of cerebral tumor. The fact remains, nevertheless, that in the great majority of instances a positive diagnosis is rarely made before well marked and

bilateral choked disc has developed and it is in the absence of this sign that the greatest difficulties are encountered. Under such circumstances we may be guided by either or both of the following factors: (1) a progressive increase in the intensity of the general symptoms, (2) the appearance of definite local symptoms which likewise exhibit a tendency to steadily increase in severity. In some cases local symptoms develop very early, in others they are tardy manifestations, in still others they are totally wanting throughout the entire course of the disease. The absence of local symptoms is particularly apt to characterize certain forms of tumor such as psammoma, lipoma, cholesteatoma and cysticercus, as well as tumors occupying the so-called silent areas of the brain, as for instance, the right frontal or the right temporal lobe. I shall return later to local symptoms under the heading of topical diagnosis and pursue for the present the further analysis of general diagnostic data.

As previously stated, there may be neither choked disc nor definitely localizing symptoms and then the diagnosis must rest exclusively upon the one remaining characteristic feature of cerebral tumor, namely, the gradual increase in the intensity of the general symptoms. Of these, the most constant, persistent and suggestive is undoubtedly headache, but before we can attach real significance to this headache, we must eliminate a large number of well known causes of headache. It must not be forgotten that headache may be due to uraemia, to migraine, to eyestrain, to syphilis, to arterio-sclerosis, to gastro-intestinal disorders or even simple constipation, to hysteria and neurasthenia, to toxic substances such as arsenic, lead, mercury, morphine, nicotine, etc., and to still other causes of lesser importance and too numerous to mention. Usually, however, it is not particularly difficult to rule out all of these causes one after another. Of the other general symptoms of tumor of the brain, the only significant or suggestive ones are the tendency to somnolence, the occasional occurrence of severe vomiting spells without adequate cause, and the slowing of the pulse rate. It is important to remember that the pulse is more apt to exhibit paroxysmal than persistent slowing; as is well known, the pulse rate may be reduced to 40, 30, or even less.

Thus, to summarize the preceding remarks, it may be said

that the diagnosis of cerebral tumor is based upon (1) the gradual increase in intensity of general symptoms indicating severe cerebral disorder, (2) the presence of choked disc, (3) the development of localizing symptoms.

Of these three elements of diagnosis, the first only is practically constant; when coupled with choked disc the general diagnosis of cerebral tumor is firmly established. When all three factors are present both the general and the local diagnoses are ensured. The absence of choked disc however should never be regarded as sufficient to offset a diagnosis otherwise based upon the association of persistent general symptoms with definitely localizing signs.

Finally, in certain cases some help may be obtained, particularly in the way of confirming topical diagnosis, by a physical exploration of the skull conducted much in the same fashion as a physical examination of the chest. It is well known, for instance, that a more or less generalized tenderness on percussion of the cranium is a common finding in cerebral tumor; in some cases, however, percussion is only painful over a given circumscribed area and then this sign may possess distinct value. This is more apt to be the case when the tumor is superficial and springs either from the cortex, the meninges, or the inner surface of the skull. Macewen has pointed out that in tumor as well as in abscess of the brain, the percussion note may be of heightened pitch and of greater resonance over the seat or in the immediate proximity of the tumor. Auscultatory percussion of the scalp may likewise be helpful and it has been noted by some observers that the audibility of the transmitted sound of the tuning fork may be appreciably diminished over the tumor, particularly if the latter be a solid growth of fair volume or one situated near the skull. Lumbar puncture has sometimes been useful and tumor cells have been identified in the cerebrospinal fluid, but the practice is highly dangerous and a fatal issue may be the penalty of the attempt particularly in cases of cerebellar tumor. Lastly, radiography may prove of help in localizing tumors of the sella turcica, those containing bone (teratoid tumors), or those which have eroded or partly dissociated the cranial bones.

As regards the differential diagnosis of cerebral tumor, it must

be said that there are very few conditions which can really occasion serious difficulty. By far the most important of these is unquestionably cerebral abscess. Between cerebral tumor and cerebral abscess the diagnosis is often difficult and sometimes impossible. Of course the pre-existence of otitis media or some other suppurative process will at once arouse suspicion, but how many cases of abscess have been recorded in which no primary focus of infection could be detected? The presence of fever strongly militates in favor of abscess and the same applies to leucocytosis, but let us not forget that the majority of cases of cerebral abscess exhibit throughout their course normal or subnormal temperatures and that changes in the blood-picture are inconstant. Changes in the mood and disposition of the patient, dulness, hebetude, sluggish cerebration, etc., occur certainly much earlier in abscess than in tumor, but it is often difficult to correctly evaluate the significance of these psychic changes. Convulsive seizures are far more common in tumor than in abscess, they frequently exhibit all the characters of ordinary idiopathic epilepsy and greatly predominate over the paralytic disorders. Cerebral abscess, on the contrary, is characterized by an almost complete inversion of features; at any rate, muscular twitchings and convulsive seizures follow rather than precede the onset of paralytic manifestations.

In a previous article, I called attention to the peculiar evolution of the hemiplegia which not infrequently develops in the course of cerebral abscess. It is a distinctly progressive hemiplegia in which the parts are not simultaneously but successively involved; in other words, it is constituted by the intervallary superposition of one monoplegia upon another and may require a week or more for its completion. Thus, the initial monoplegia may affect the upper extremity, after the lapse of three or four days the lower extremity becomes disabled, and finally a few days later the face shows evidence of palsy. This type of hemiplegia I regard as being practically diagnostic of cerebral abscess.

Between cerebral tumor and epilepsy the diagnosis may at times be difficult and there are authentic cases on record in which the only symptom of cerebral tumor present during a considerable period was the paroxysmal occurrence of convulsive seizures. Such cases must be very uncommon. In both

epilepsy and tumor the convulsions may be generalized and associated with loss of consciousness, but in ordinary idiopathic epilepsy, of course, the convulsion remains the only symptom, the other manifestations of cerebral tumor are wanting. If choked disc is present in connection with either epileptiform seizures or coma, the diagnosis of cerebral tumor is assured. Likewise, the occurrence of transitory palsy of an extremity or part of it after a convulsive attack plainly indicates the existence of a local lesion.

Uncomplicated or so-called primary internal hydrocephalus is a very rare condition in the adult, but when it occurs it may simulate cerebral tumor in every particular and more especially tumor of the cerebellum inasmuch as it produces bilateral spasticity and sometimes tremor of the extremities, cerebellar ataxia and well marked optic neuritis or choked disc, besides all the general symptoms of tumor. The very slow course of the disease which presents many remissions and intermissions, the frequent and usually symmetrical implication of several of the cranial nerves (oculomotor, abducens, trigeminus, facial, etc.), the common occurrence of bitemporal hemianopsia, partial deafness and polyuria, the bilaterality of the objective disorders in the extremities and the absence of all focal hemispheral symptoms are all factors, however, which may be counted upon to establish the identity of the condition. It has been claimed by some observers that, even in the adult, internal hydrocephalus may produce some deformity or enlargement of the skull, but this hardly seems credible. Of course it must not be forgotten that sooner or later an associated internal hydrocephalus develops in a large percentage of cases of cerebral tumor.

Cerebral syphilis not infrequently yields a clinical picture identical in all respects with that of cerebral tumor. I refer not so much to the isolated intracerebral gumma which after all is neither more nor less than a cerebral tumor, although a far rarer one than is generally supposed, but to circumscribed gummatous meningitis, to the gummatous patch or placard more particularly of the convexity. It may give rise to all the general and local manifestations of the most classic cerebral tumor and exhibit the same progressiveness in the development and intensity of its symptoms. The much emphasized nocturnal

headache is of meagre significance when we have learned to appreciate the fact that in cerebral tumor, whatever its nature, the headache is frequently attended with vesperal exacerbation, and, in some cases, essentially nocturnal in its appearance. It would be useless to pursue a lengthy discussion of the various points of differential diagnosis inasmuch as we are now able to avail ourselves of the reliable data furnished by laboratory methods. The unfailing and precocious cerebrospinal lymphocytosis and the positive Wassermann-Noguchi reaction obtained with the blood or the cerebrospinal fluid or both leave no legitimate excuse for an error in diagnosis. The same elements of differentiation are applicable to general paresis which may, in certain cases, closely resemble tumor of the frontal lobe.

While it is true that in the vast majority of cases cerebral tumor is characterized by the insidious and gradually progressive development of its symptomatology, it may, in rare cases, have an acute and even an apoplectiform onset. This is particularly apt to occur in vascular forms of glioma in which a large hemorrhage takes place. The first evidence of the existence of such a growth may be furnished by the abrupt appearance of coma with or without subsequent hemiplegia—a clinical state highly suggestive if not typical of apoplexy. The occurrence of such an attack in a young adult presenting no evidence of arterial degeneration, particularly if the Wassermann-Noguchi reaction be negative, should always make one suspicious. The history of prolonged headache and more especially the presence of choked disc will hardly leave, under such circumstances, any reasonable doubt as to the diagnosis.

There are still other conditions which may be confounded with cerebral tumor and among them hysteria and multiple sclerosis are mentioned in the majority of text-books. It is well known likewise that nephritis, lead poisoning, and anaemia, more particularly chlorosis, often give rise to cerebral manifestations which in some cases realize almost in its entirety the symptom complex of cerebral tumor. It would seem, however, that if the least care were exercised in the observation of the case and our actual methods of clinical diagnosis properly utilized none of these various conditions could possibly lead to an error in diagnosis.

There yet remains for us to consider the all important question of topical or regional diagnosis. This necessarily implies an intimate acquaintance with the actual doctrine of cerebral localization. The correct localization of a brain tumor is strictly dependent, indeed, upon an accurate knowledge of the functional losses resulting from disease of the various physiologic areas and centres of the brain. It must be remembered that the lesion of each individual area or centre betrays itself clinically by an essentially specific functional deficit, and naturally this regional manifestation will vary with the situation of the tumor. While it would be impracticable to pass in review all the possible local symptoms which may result from tumors of each individual area, it seems advantageous to mention the more significant and reliable data which we possess concerning important localizations.

Lesions of the frontal lobe (excluding the ascending frontal convolution) of either hemisphere, but more particularly of the left one, at least in right-handed individuals, often produce decided changes in the moral and mental characteristics of the patient, and while the resulting psychic manifestations may assume the most diverse types a more or less prominent deterioration of the higher intellectual attributes is the feature most commonly encountered. Of course it is a fact that some mental impairment may result from lesions involving any part of the cerebral cortex, but it is universally conceded nevertheless that frontal localizations are characterized by an especially striking and precocious development of psychic disturbance. Melancholic and maniacal states have both been observed but the more usual phenomena consist in progressive loss of memory and power of attention, lack of judgment, irritability and obstinacy, inability to exercise self-control and a marked inclination to disregard the ordinary concepts of tidiness and decency. Mental apathy together with a persistent tendency to somnolence is regarded by many as a focal sign of frontal lobe disease. A peculiar and interesting form of psychic disorder has been described by Jastrowitz under the name of *moria* and by Oppenheim under that of *Witzelsucht;* it is characterized by a state of happy indifference, total lack of realization of the gravity of the illness and an habitual tendency to undue and even morbid jocularity. The patient constantly tries to amuse his surroundings and seizes every oppor-

tunity to exhibit his wit and humor. In this connection it is significant to recall the exuberance and megalomania of general paresis, in which disease, as is well known, the meningo-encephalitic lesions predominate over the fronto-parietal region.

In tumors involving more particularly the mesial surface of the frontal lobe a more or less marked titubation, or insecurity of station and gait, may result, which cannot be distinguished from the ataxia produced by cerebellar disease.

Convulsive seizures occurring in connection with frontal lobe tumors are not infrequently ushered in or accompanied by exaggerated contralateral conjugate deviation of the head and eyeballs, and sometimes the entire trunk participates in the rotary deviation.

It is a classic dogma that lesions of the left inferior frontal convolution in right-handed individuals give rise to motor aphasia or loss of articulate speech, but the doctrine has not yet received universal recognition. A few cases are on record in which a lesion of the base of the left middle frontal convolution apparently produced motor agraphia or inability to write, without concomitant motor weakness of the correlated musculature of the upper extremity.

It has been claimed by Granger Stewart that absence, diminution, or rapid exhaustion, of the contralateral abdominal reflex, and a fine rapid vibratory tremor in the limbs on the same side are suggestive of tumor of the frontal lobe.

Very recently it has been advanced by Foster Kennedy that tumors or abscesses involving the inferior or orbital surface of the frontal lobe produce homolateral retro-bulbar optic neuritis, central scotoma and optic atrophy, and contralateral choked disc. The anatomic justification of this assumption is clearly evident, but as far as I know corroborative data have not been furnished thus far by other observers; nevertheless the finding is an interesting one and may yet prove to be of great diagnostic importance. Tumors in the same situation may likewise compress or otherwise involve the olfactory tract and produce anosmia.

Tumors situated in or near the motor area or central convolutions give rise to the well known phenomena of Jacksonian epilepsy, and to gradually progressive paralytic disorders which are essentially monoplegic in type although they may subse-

quently exhibit a more extensive distribution. Persistent pains and especially paraesthesiae limited to one extremity also occur, but by far the most significant sensory disturbance consists in impairment or loss of the stereognostic sense without associated involvement of the ordinary elementary forms of objective sensibility, *i. e.*, without the co-existence of definite anesthesia and analgesia. It is a fact, however, that astereognosis likewise results from lesions of the supramarginal gyrus, and it may well be questioned, therefore, if the occurrence of this symptom in tumors of the Rolandic area is not due in reality to implication of the adjoining portion of the supramarginal convolution.

Lesions of the parietal lobe (excluding the posterior central convolution) produce a variety of important disturbances, but perhaps the most significant of them all is loss of muscle sense together with motor apraxia and astereognosis in the contralateral extremities. This symptomatic triad is particularly associated with lesions of the anterior segment of the supramarginal gyrus and the contiguous portion of the superior parietal lobule.

Deep seated lesions of the supramarginal and angular gyri may determine contralateral hemianopsia by involving the optic radiation of Gratiolet, and they may likewise produce conjugate deviation of the head and eyeballs particularly if they encroach upon the corpus callosum.

In right-handed individuals the lesion of the left angular gyrus not infrequently determines well marked alexia.' This alexia is often accompanied by agraphia (sensory agraphia of Déjerine and Oppenheim), and sometimes by optic aphasia and right-sided hemianopsia as well.

Another interesting disorder which may result from lesions of the angular gyrus is a disturbance of optic orientation known as astereoscopy and characterized essentially by defects of accommodation, such as the inability to estimate distances and to correctly appreciate the relative position of objects in space. It must be stated, however, that this disorder has been observed mainly in cases of bilateral disease.

Occipital localizations are characterized essentially by the presence of contralateral homonymous hemianopsia with preservation of the macular field of vision. While this symptom may result from tumors situated in any part of the occipital lobe, it

is particularly constant in lesions which involve the calcarine region. In rare cases, the limitation of the lesion to either the superior or inferior lip of the calcarine fissure has produced a typical quadrantal defect which has been called quadrantic hemianopsia, or more correctly, tetranopsia. The contralateral lower quadrants of the field of vision are lost when the lesion involves the superior lip of the calcarine fissure and *vice versa*. Visual hallucinations, scintillating scotoma and hemiachromatopsia, frequently are prodromal manifestations of hemianopsia in occipital tumors and may be of great value for early diagnosis.

Lesions of the convexity of the left occipital lobe in right-handed individuals may give rise to a peculiar disorder known as psychic or mind blindness. In this condition, the patient undoubtedly retains some degree of vision as he avoids obstacles in walking, but he does not understand or correctly identify what he sees and no longer recognizes what was formerly familiar and well known to him, such as his house, his food and even the members of his own family. It is a fact, however, that in the majority of reported cases, mind-blindness was associated with more or less complete double hemianopsia and resulted from bilateral disease of the occipital lobes. Another interesting symptom which may occur in lesions of the left occipital lobe in right-handed individuals is optic aphasia, a condition in which the patient cannot give the name of an object held before his eyes although he sees it clearly enough, recognizes it perfectly and can even explain or otherwise indicate its use or purpose. Optic aphasia only occurs in lesions which involve the association fibres running between the temporal and occipital lobes and therefore in lesions which occupy more particularly the transition zone between these two lobes (posterior extremity of second and third temporal convolutions and contiguous portion of the occipital convexity). Optic aphasia may occur alone, but frequently it is accompanied by alexia and hemianopsia and sometimes by partial sensory aphasia.

Finally, it is well to remember that occipital tumors which have attained considerable proportions may produce pontine and especially cerebellar symptoms as the result of pressure, despite the protection afforded by the ordinarily resistant tentorium.

Tumors of the right temporal lobe, an essentially silent area

in the classic sense, may reach considerable size and yet produce no definite signs of local cerebral disorder. It is all otherwise when the lesion involves the left temporal lobe and more particularly the posterior extremity of the first and second temporal convolutions. In right-handed individuals, implication of this area almost invariably leads to the development of sensory aphasia or loss of the power to understand spoken language. The degree of this functional disorder may be variable in the extreme, but a measurable loss of sensory speech is practically constant, and it may be said that Wernicke's aphasia represents one of the most solidly founded of our anatomo-physiological data. Alexia is often associated with sensory aphasia and agraphia may likewise be present.

Tumors situated in the antero-median segment of the temporal lobe and involving the uncinate gyrus have in many cases produced peculiar attacks known as uncinate fits. These attacks are ushered in by intensely disagreeable olfactory or gustatory hallucinations and characterized by violent smacking and sucking movements of the lips and mouth and sometimes by movements of mastication or swallowing. Consciousness is usually retained, though commonly perturbed, and not infrequently there is associated a dreamy state in which the patient is obsessed by a sense of unreality. Convulsive seizures may or may not accompany these peculiar manifestations. Tumors occupying this same region occasionally produce upper quadrantal defects of the field of vision by involving the ventral détour of the geniculo-calcarine fibres coursing to the lingual lobule.

Deep-seated or subcortical tumors occupying the middle segment of the cerebral hemisphere involve sooner or later the basal ganglia and the enclosed internal capsule. The implication of the anterior limb of the internal capsule often produces no characteristic symptoms, although cerebellar ataxia (fronto-cerebellar tract), choreiform or ataxic movements in the contralateral upper extremity and emotional disturbances have been observed in a few carefully recorded cases. The involvement of the posterior limb of the internal capsule manifests itself by contralateral hemiplegia, hemianesthesia and hemianopsia. If the lesion is situated in the left hemisphere the hemiplegia may be accompanied by motor aphasia.

Localizations affecting the caudate and lenticular nuclei do not yield a characteristic symptomatology in the strict sense of the word. By reason of its actual contiguity the internal capsule is almost necessarily encroached upon and hence the above mentioned capsular symptoms are commonly present. It must be said, however, that recent researches have thrown some light upon the probable physiology of the corpus striatum and that some fairly significant data have been supplied by competent observers. In a number of cases, a very decided and persistent elevation of body temperature has been noted. Choreiform and athetoid movements, Parkinsonian tremor and other convulsive or spasmodic manifestations in the contralateral extremities have repeatedly been encountered in lesions involving either the lenticular nucleus itself or the structures bordering directly upon it (external capsule, retro-lenticular zone, etc.). I have seen several cases of left-sided lenticular disease (circumscribed encephalomalacia, intranuclear hemorrhagic cyst), in which anarthria or marked dysarthria, spasmodic laughter and crying, slight contralateral motor weakness and vesical incontinence were the main manifestations and believe that this syndrome probably embodies the most characteristic features of intrinsic lenticular localizations. This supposition is in perfect accord, moreover, with the clinical aspect of the disease recently described by Wilson under the name of "progressive lenticular degeneration."

Lesions limited to the optic thalamus do not produce hemiplegia, but do give rise to persistent contralateral hemianesthesia which may affect all forms of superficial and deep sensibility, although in general the latter is far more severely disordered. These objective losses are commonly accompanied by obstinate paroxysmal pains of exceptional intensity. Contralateral hemiataxia, choreiform and athetoid movements have frequently been observed. A peculiar contralateral facial phenomenon has been described consisting in unilateral palsy of the facial musculature upon emotional display with preservation of volitional contraction. By many this is regarded as a focal sign of exceptional value. Finally, contralateral vaso-motor disturbances may occur, such as oedema, elevation of surface temperature, hyperaemia and hyperidrosis.

Lesions of the quadrigeminal region and more particularly of

the anterior colliculi produce dilatation and immobility of the pupils and, owing to the proximity of the oculomotor nuclei, more or less pronounced ophthalmoplegia. A bilateral palsy of homologous muscles is especially characteristic and the limitation of ocular excursion is commonly restricted to the upward and downward movements of the eyeballs. The involvement of the posterior colliculi may manifest itself by a varying degree of deafness, passive tremor, and cerebellar ataxia with especial tendency to fall directly backward.

Tumors of the cerebral peduncle produce, if distinctly unilateral, the typical Weber syndrome characterized by homolateral oculomotor palsy and contralateral hemiplegia. Sometimes the Benedikt syndrome is realized instead, and the oculomotor palsy on the side of the lesion is associated with contralateral tremor which may be of the intention type though usually of the Parkinsonian variety. The latter syndrome is particularly apt to result when the peduncular lesion involves mainly the red nucleus and the substantia nigra. More or less cerebellar ataxia is frequently associated with Benedikt's syndrome. In other cases, the lesion of the peduncular tegmentum gives rise to homolateral oculomotor palsy and contralateral hemiataxia.

Tumors of the pineal body may give rise to practically the same symptomatology as that due to primary involvement of the quadrigeminal bodies owing to the ease with which they exert pressure upon these structures. It has been recently shown, however, that they may also produce, particularly if they occur in early life, a perfectly autonomic syndrome known as "macrogenito-somia." This condition is characterized by precocious and exaggerated development of the sexual organs, prematurity of thought and speech and general body overgrowth. The symptom-complex has been best observed in male children.

Tumors of the pons and medulla are characterized by the predominance of focal manifestations and the insignificance of symptoms of intracranial hypertension. Choked disc is frequently wanting and convulsions are rare. Perhaps the most typical focal symptom of tumor of the pons is alternating or crossed paralysis, *i. e.*, palsy of the facial, abducens and trigeminus (or only one of these) on the side of the lesion, and of the extremities on the opposite side. Of course this only holds good in cases of uni-

lateral localization, and, as in the majority of instances the neoplasm involves more or less diffusely the greater part of the pons, some evidence of bilaterality is to be expected sooner or later and then dysarthria and dysphagia likewise develop. Tumors of the pons generally compress or otherwise implicate the cerebellar peduncles and thus determine cerebellar ataxia, the tendency being to fall or sway toward the side of the lesion if the tumor be distinctly unilateral. A very characteristic symptom of superior pontine localizations is loss of conjugate or associate lateral movements of the eyeballs with preservation of vertical excursion and convergence. The involvement of the fillet of course will manifest itself by corresponding sensory losses both objective and subjective. The other symptoms which have been described in connection with pontine tumors and which deserve mention are paroxysmal hyperpyrexia, sialorrhea, albuminuria, polyuria and frequent incontinence of the organic reflexes.

Tumors of the medulla resemble in general tumors of the pons and produce unilateral or bilateral paralysis of the extremities together with symptoms referable to the involvement of the eighth to the twelfth cranial nerves. Hence deafness, anarthria or dysarthria, aphonia or dysphonia, dysphagia, hypoglossal palsy, hiccough and various cardio-respiratory disturbances may occur in all possible combinations. Cerebellar ataxia is very common and homolateral or contralateral motor ataxia may likewise develop. Secretory and vasomotor disturbances are not uncommon, and homolateral loss of sweating or contralateral increase of sweating has been repeatedly noted. Glycosuria and diabetes insipidus have likewise been observed in a fair number of cases. Myosis, enophthalmia and incomplete ptosis on the same side as the lesion are important focal manifestations.

Tumors of the cerebellum, in contradistiction to tumors of the pons and medulla, are characterized by the early and prominent development of the general symptoms of increased intracranial pressure. Optic neuritis or choked disc is present in approximately ninety per cent. of cases, and vertigo and vomiting are apt to be particularly persistent and distressing. The headache is usually suboccipital, but not infrequently it is frontal as well and in some cases it is exclusively frontal. The most constant and characteristic focal symptom of cerebellar disease is prob-

ably cerebellar ataxia although we know that this symptom may likewise result from involvement of either the superior or middle cerebellar peduncle. Cerebellar ataxia is practically constant in lesions of the middle lobe or vermis. When the lesion is strictly confined to either cerebellar hemisphere the typical cerebellar gait may be wanting entirely or manifest itself simply by lateropulsion, and, contrarily to what is stated in the majority of text-books, the tendency is to fall or sway toward the side of the lesion. Tremor is a frequent manifestation and very commonly resembles the intention tremor of multiple sclerosis; likewise, the speech may exhibit the same peculiar scanning and explosive features observed in this disease. In fact, it may be admitted, I believe, that intention tremor and scanning speech do not occur in multiple sclerosis, unless the cerebellum and its peduncles are materially involved by the sclerotic patches. Another common symptom is nystagmus, and when the lesion is essentially unilateral the oscillations become manifest particularly or only when the eyes are turned toward the side of the lesion. A more or less marked rigidity or retraction of the head, or a tendency to hold the head in certain fixed positions, usually to one side, is very common in cerebellar tumor, and sometimes the entire trunk likewise assumes a definite abnormal attitude. The symptoms recently described by Babinski, more particularly asynergy, hypermetria and adiadochokinesis, have not received the recognition which they deserve as they unquestionably represent valuable signs of intrinsic disorder of the cerebellar mechanism. When the lesion is unilateral or limited to one cerebellar hemisphere these manifestations occur on the same side. The pressure of such a hemispheral tumor upon the pons and medulla explains the occasional occurrence of homolateral facial palsy, trigeminal neuralgia and auditory disturbances, and of contralateral spastic paralysis of the extremities. Not infrequently a false hemiplegia develops on the same side as the lesion; it is constituted not so much by actual motor weakness as by a state of atony or flaccidity of the musculature of the extremities accompanied by marked diminution or even abolition of the tendon reflexes. This hemiatony is commonly associated with hemiataxia. Finally, convulsive seizures, unilateral or bilateral, may occur in the course of cerebellar tumor, and likewise certain

attacks of opisthotonos or of tetanic rigidity involving more or less completely the entire musculature of the body during which consciousness usually remains intact.

The symptomatology of tumors of the pituitary body or hypophysis cerebri has received abundant attention in recent years and such excellent monographs have appeared on the subject that it would be needless to incorporate in this article any exhaustive review of the various symptom-complexes which may be associated with hypophyseal localizations. The most important focal manifestations are due to disordered glandular function and to involvement of the visual apparatus. The perturbation of glandular function may reveal itself by perverted nutritional states indicating either increased or diminished glandular activity, or, in other words, by evidences of either hyperpituitarism or hypopituitarism. In the first case, we have to do with the familiar picture of gigantism or acromegaly, depending upon whether the manifestations appear early in the course of development or only in adult life; in the second case, the adiposo-genital syndrome of Fröhlich is the type of nutritional disturbance encountered. It is now pretty generally conceded that acromegaly is associated essentially with simple hypertrophy or adenomatous tumor of the pituitary body, whereas the Fröhlich syndrome results from pressure atrophy of this gland determined by a tumor springing either from this structure itself or from neighboring parts. The visual disorders consists in amblyopia, bitemporal though sometimes homonymous hemianopsia and primary optic atrophy. Optic atrophy occurs in about fifty per cent. of cases whereas choked disc is usually absent. Pressure upon the oculomotor nerve may give rise to ophthalmoplegia though this is rare. Exophthalmos has been noted in some cases. Anosmia may result from implication of the olfactory system. Finally, glycosuria is very common and is frequently accompanied by polyuria, polydipsia and polyphagia.

Extra-cerebral tumors occupying the fossae of the base of the skull manifest themselves mainly by symptoms referable to involvement of the cranial nerves. Tumors of the anterior fossa may thus determine anosmia, amblyopia and optic atrophy, ophthalmoplegia (oculomotor) and neuralgic pains in the forehead (ophthalmic division of the trigeminal). If the tumor is

so situated as to simultaneously compress the mesial surface of both frontal lobes, cerebellar ataxia may result. Tumors in the middle fossa are apt to involve the Gasserian ganglion and determine obstinate trigeminal neuralgia and later keratitis neuro-paralytica. Likewise the oculomotor and abducens nerves may be compressed and a varying degree of ophthalmoplegia is noted in the majority of reported cases. Tumors in the posterior fossa may involve, either on one or both sides, any of the cranial nerves from the sixth to the twelfth and usually produce symptoms resulting from actual compression of the brain-stem (medulla, pons and cerebellum).

A seat of predilection for extra-cerebral basilar tumors is the cerebello-pontine angle and a large number of cases of this kind have been reported. Tumors in this situation may give rise to an exceptionally varied symptomatology; nevertheless, certain features are particularly characteristic and among them the so-called cerebellar seizures described by Dana. These attacks consist in loud tinnitus or roaring sound, vertigo, a tendency to fall to the ground or to pitch in one direction, a sudden blindness or loss of consciousness and, in severe attacks, tonic spasms of the extensors lasting several minutes. Other symptoms equally important are partial deafness, homolateral paresis of the facial musculature and loss or diminution of the corneal reflex, pain in the domain of the occipital nerve, limitation of associated lateral movement of the eyeballs towards the side of the tumor, slight ataxia of the arm on the same side and sometimes a certain degree of dysarthria and dysphagia.

If I have taken up in detail the focal symptomatology of one region after another, it is not because I nourish the vain hope that the correct localization of a brain tumor will greatly multiply the chances of its surgical extirpation; the statistics based upon the conjoined efforts of the most eminent neurologists and the most skilled surgeons show only too plainly that the percentage of removable tumors is extremely small, hardly more than seven per cent. Nevertheless, accurate localization retains all its significance on account of its important bearing upon the choice of operative procedure as well as upon the determination of the point at which the skull should be approached in order that intervention may yield its maximum benefit.

THE PATHOLOGY OF BRAIN TUMORS.

Read before the Medical Society of the County of Albany, February 12, 1913.

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In the study of most organs, it is the nature of the lesion that interests us. In the central nervous system, however, the location of a lesion and the symptoms depending upon its location are often of greater importance than its histological nature and receive the greater attention. It is perhaps due to this fact that there is no exact uniform classification for the multiform growths that arise from the brain and its membranes.

Brain tumors are quite frequent. Almost every form of new growth may occur in the cranial cavity. The most commonly encountered types are glioma, sarcoma, tuberculoma, syphiloma or gumma, endothelioma, carcinoma, fibroma, psammoma, lipoma and cholesteatoma. Tuberculoma and gumma are considered in this classification, although they are not, strictly speaking, true tumors, but are inflammatory in nature or infectious granulomata. Because of their frequently close similarity in gross appearance and symptomatology, they may well be listed as brain tumors. In no other part of the body, however, are such nodules regarded as tumors.

The most common of the true tumors is undoubtedly the glioma. An examination of the records of the Bender Laboratory shows a series of twenty-eight brain tumors. Of these, twelve were gliomata, five sarcomata, one endothelioma, one tuberculoma, three gummata, two cholesteatomata, one psammoma, one carcinoma, and two lipomata. Although this is a small number to draw conclusions from, the proportions correspond quite closely to those reported in larger series. In a study of 265 cases at the National Hospital, London, Howard H. Tooth cites the following figures: Glioma, fifty-five per cent., endothelioma fourteen, sarcoma eight, carcinoma six, tuberculoma five, cholesteatoma seven-tenths, pituitary one, and pineal one per cent.

Cushing, in a series of seventy operative cases, reports twenty-seven gliomata, seven endotheliomata, one sarcoma, one car-

cinoma, four gummata, four tuberculomata, one osteoma, one ecchinococcus cyst, five mixed tumors, seventeen pituitary, and fifteen pineal adenomata. His well known pioneer work in pituitary and pineal surgery accounts for the apparently high percentage of growths in these locations.

Glioma. A tumor may be defined as a new formation of cells possessing various characteristics of the cells from which it arises and which tends to proliferate continuously and without control. From this definition it can be understood that a true primary tumor of the brain would be one, the cells of which arise from, and possess characteristics of brain tissue cells. Such

FIG. 1. A-11-74—Glioma of left parietal lobe with large hernia cerebri. Posterior aspect of brain. Six months after decompression operation.

a tumor is a glioma and is always primary. This tumor arises from and is composed of neuroglia cells. It should be remembered that neuroglia cells are the so-called "mossy" and "spider cells" producing the numerous glial fibrils which form the supporting structure for the more actively functionating ganglion cells and their processes. Neuroglia may be likened in function to the supporting connective tissue of other organs. It is, however, epiblastic in origin, being formed from the embryonic ecto-

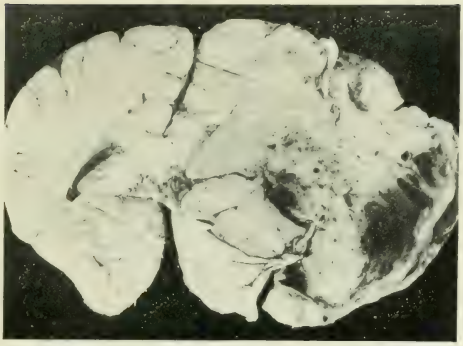

FIG. 2. A-11-74—Anterior surface of Fig. 1.

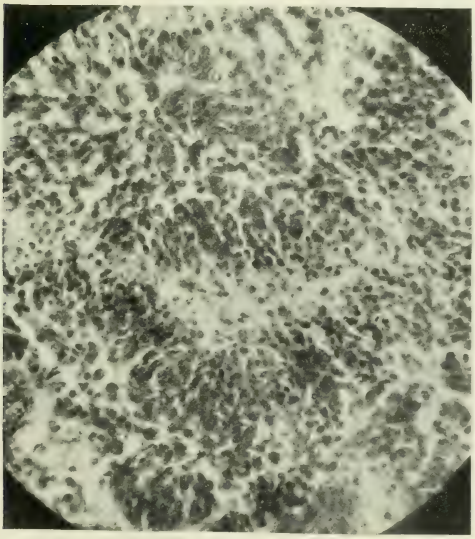

FIG. 3. O-1283—Glioma showing characteristic rosette arrangement of its cells. Micro-Photograph 150x.

derm and cannot be considered as a true connective tissue which is always of mesoblastic origin. The numerous minute interlacing fibrils produced by the neuroglia cells are termed glial fibrils. They give a characteristic reaction with certain staining

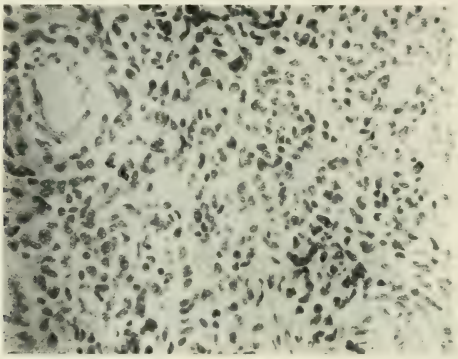

FIG. 4. A-13-39—Glioma similar in appearance to sarcoma. Micro-Photograph 120x.

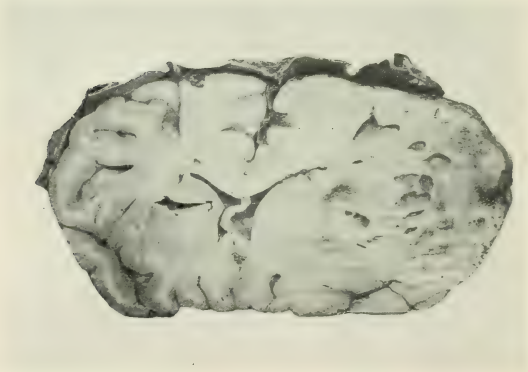

FIG. 5. A-13-39—Glioma of right parietal lobe. Cystic areas of degeneration are present.

reagents and can be definitely differentiated from the fibrils of fibrous connective tissue. Thus it is that in the examination of a brain tumor, the presence of glial fibrils straightway marks it as one of neuroglia tissue or a glioma. The presence of these fibrils determines it to be a glioma and not a sarcoma or true connective tumor which it so often simulates microscopically.

This tumor then is one composed of neuroglia cells producing the characteristic glial fibrils. The microscopical picture varies greatly. Rapidly growing tumors are characterized by a great predominance of the neuroglia cells with a comparatively small number of intercellular glial fibrils, while on the other hand the less rapidly growing types show the formation of glial fibrils in great numbers with a relatively small distribution of cells. Occasionally there is a characteristic rosette arrangement of the cells as shown in Fig. 3.

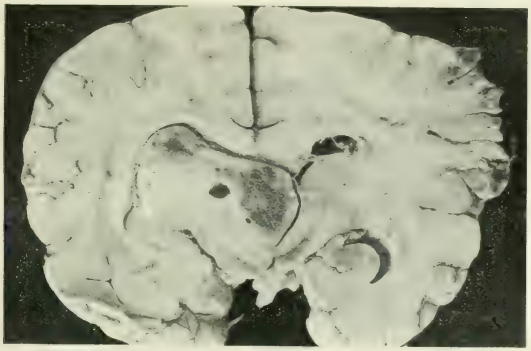

FIG. 6. A-14-29—Glioma of left basal ganglia. Marked distortion of lateral ventricle.

Grossly the glioma is usually of the same consistence as brain tissue. It is rarely sharply circumscribed, but merges imperceptibly into the surrounding brain tissue. For this reason, this tumor is not often a favorable one for operative removal, although occasionally definite encapsulation may be present. A great tendency is noted in all glioma tissue to early degeneration

with liquefaction, forming numerous cysts. These tumors are very vascular and most often grow rapidly, destroying brain tissue. They rarely, if ever, matastasize to distant parts. In one of the cases autopsied by Dr. Blumer, an irregular ulcerating tumor mass presented on the forehead. This, however, was found to be a direct extension from a glioma of the frontal lobe, which had eroded through the frontal bone. The length of time from the onset of the first symptom until death varies greatly. Tooth gives six weeks to nine years with an average of 16.2 months as "the survival period."

Of the twelve cases of glioma on our records, three were located in the parietal lobe, two were frontal, two cerebellar, and five in the basal ganglia. The average age at death was fifty-one years.

Sarcoma. Sarcoma is a malignant tumor arising from connective tissue. In the brain it may be primary or secondary. Connective tissue in the brain is small in amount and limited in distribution to the membranes and perivascular sheaths. A primary

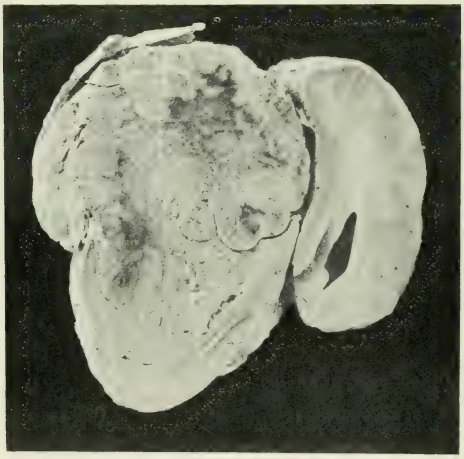

FIG. 7. A-11-36—Enormous sarcoma involving nearly the entire hemisphere. Distinct demarcation is present.

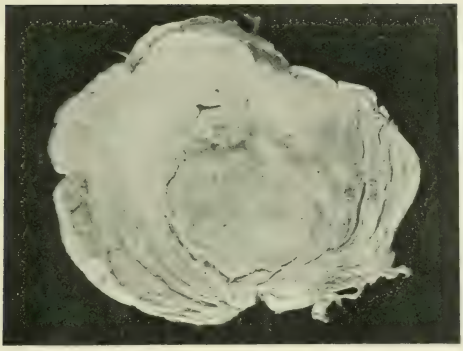

FIG. 8. S-14-845—Small round cell sarcoma—cerebellum.

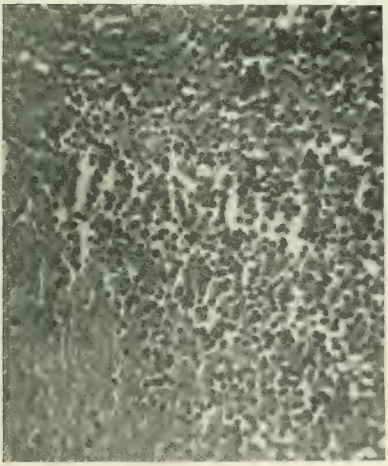

FIG. 9. S-14-845—Small round cell sarcoma. Micro-Photograph 120x.

sarcoma of the brain must then take its origin from the above mentioned parts.

This tumor is more often definitely encapsulated, it is of firm consistence, and compresses and indents rather than infiltrates the brain tissue. It is therefore more favorable for operative removal. All forms of sarcoma may occur, the spindle-cell and round-cell types being most often noted. Microscopically, they sometimes present considerable difficulty in the differentiation from a glioma. In doubtful cases, the absence of glial fibrils in specially stained sections usually differentiate it from the glioma, which it may closely resemble. Of the four cerebral sarcomata in our records, three were primary and one secondary.

Endothelioma. An endothelioma is a tumor, the cells of which are derived from the endothelial cells lining blood and lymph

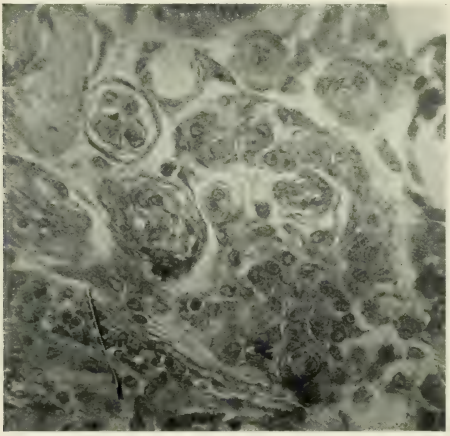

FIG. 10. O-1347—Dural endothelioma. Micro-Photograph 200x.

vascular spaces. These cells tend to form irregular and atypical vascular spaces. As a brain condition, this tumor most commonly occurs as a circumscribed growth in the dura mater and is called the dural endothelioma. In this location there is noted

a characteristic tendency to the formation of large and concentric masses of cells or whorls. Subsequent hyaline degeneration of these whorls is quite frequent, giving rise to a condition simulating the epithelial pearls of epidermoid carcinoma.

This tumor is generally considered as benign and rarely shows any tendency to invade the brain tissue. It may, however, exert a great deal of internal pressure in its growth, causing atrophy of brain tissue with characteristic symptoms. It also occurs in the pia-arachnoid and the choroid plexus.

The one case observed by this laboratory measured one centimeter in diameter and was located in the dura over the parietal lobe. It gave rise to no symptoms during life and was in no way accountable for the death of the individual. These tumors may often attain a large size.

Tuberculoma. This condition is commonly known as the solitary tubercle. It is a circumscribed, walled-off mass of tubercu-

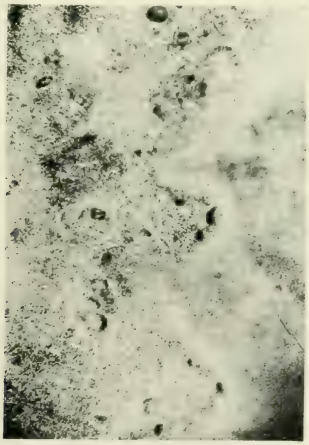

FIG. 11. A-12-44—Solitary tubercle. Section through peripheral zone showing central necrosis, tuberculous granulation tissue with giant cells. Micro-Photograph 60x.

lous material found in the substance of the brain. It presents the characteristic picture of central caseation with a peripheral zone of confluent tubercles and dense granulation tissue. They are often multiple and may be four to five centimeters in diameter. They produce their symptoms through pressure and interference with the circulation. They are quite common in children and are nearly always accompanied by tubercle lesions elsewhere. The terminal condition is often one of acute miliary tuberculosis. The one case of our records showed three solitary tubercles averaging four centimeters in diameter, located in the parietal, occipital and temporal lobes. There was an accompanying miliary tuberculosis of the lungs, liver and spleen.

Syphiloma or Gumma. The most common seat of this tumor is the base of the brain. Symptoms pointing to a tumor at this location should lead one to suspect a gummatous involvement. The pia arachnoid is primarily involved with extension of the process into the cortex. Next to the base, the frontal and parietal portions are most commonly affected. They may be single or multiple and rarely attain a diameter greater than three centimeters. When multiple, a coalescence of the individual gummata often occurs with a large diffuse involvement of the cortex. Histologically these tumors have the typical appearance of syphilitic tissue elsewhere and are surrounded by a dense zone of granulation tissue. Because of the slowness of absorption of this granulation tissue by therapeutic means, the operative removal of accessible gummata may be indicated.

Carcinoma. This is always a secondary or metastatic tumor in the brain. It may perhaps be of interest to cite the following unusual case embodied in our records. A woman fifty-two years of age presented definite symptoms of brain tumor. At operation a very vascular diffuse tumor mass was found involving the parietal lobe with erosion into the parietal bone. Microscopical examination of portions submitted showed normal thyroid gland histology. It had been noticed that the patient presented a unilateral moderate enlargement of the thyroid. No symptoms referable to this condition were present and in the presence of definite symptoms pointing to brain tumor, no importance was placed upon the thyroid hypertrophy. The woman died shortly

after operation and although no post-mortem examination was obtainable, it is safe to presume that a malignant tumor of the thyroid gland was present. This was in the nature of a carcinoma with normal thyroid histology and had rapidly metastisized to the brain, where it gave rise to the definite symptoms of a primary brain tumor.

Cholesteatoma. This form of tumor is essentially a brain condition. It is a curious but interesting tumor, the exact nature of which is not understood. It is found more particularly in association with the membranes of the brain and is characterized by the presence of little pearly nodules. These are formed by clusters of cholesterin crystals. Because of this fact it is also known as the " Pearl tumor." In appearance and structure these tumors otherwise resemble the endothelioma and are regarded as such by many observers.

Psammoma. This is a tumor of doubtful origin, but like the cholesteatoma it bears a resemblance to the endothelioma. They present throughout their substance numerous calcareous concretions, simulating corpora amylacea. These tumors may be scattered beneath the dura and within the choroid plexus. When of small size they are commonly known as Brain Sand. Both the psammoma and the cholesteatoma are essentially benign tumors. They are usually discovered when their presence was not suspected during life.

Tumors of the pituitary and pineal glands are comparatively rare. They usually occur as simple hypertrophies or adenomata.

Parasitic cysts have been described and may be considered with tumors of the brain. They are of very infrequent occurrence and have been more often recorded in Austrian and German publications then in this country.

Other varieties of tumor, such as lipoma, fibroma, myxoma, angioma, osteoma, which may occur in the brain are of great rarity and consequently of little importance.

The appearance of a brain in which a tumor has developed is usually characteristic. There is an increased tensity of the membranes, a flattening of the convolutions through pressure, and a distension of the ventricles with fluid. The weight of the brain is increased and there is a distinct asymmetry of the two

hemispheres with a sense of increased resistance over the affected side.

Tumors may be found in any part of the brain substance and may occur at any age. The resulting symptoms are affected little by nature or variety of tumor growth, but depend almost entirely upon its location, size and the amount of atrophied and destroyed brain tissue. Only a very small proportion afford a favorable field for surgical interference.

THE TREATMENT OF BRAIN TUMORS.

Read before the Medical Society of the County of Albany, February 12, 1915,

By DAVIS BAKER, M. D.,

The treatment of a person afflicted with a tumor of the brain presents one of the most difficult problems that a medical man can meet. It is admitted by all that the only hope of relief rests on surgical intervention, but until very recently there was little definite knowledge available to the surgeon when called upon to deal with an intracranial growth. Many facts have been made known during the past year by the publication of the results of the treatment of several large series of cases of intracranial tumor. Tooth, of London, has made a very careful study of the records of 265 cases operated on at the National Hospital, London, by Sir Victor Horsley and his colleagues; Von Eiselsberg and Ranzi have published the results of 168 cases operated on at the former's clinic in Vienna and Kuttner, of Breslau, reports 100 cases from his clinic.

The three series of cases give us data which seems very discouraging, but we must remember that they include cases operated on during the last ten years and that these years have been the period of development of cerebral surgery, also, that the experience gained from these cases taught the primary lessons of this branch of surgery.

The mortality among the cases mentioned seems prohibitive. Tooth states that the ultimate mortality at the National Hospital was 53.3%, and that the post-operative mortality was 32%. Von Eiselberg's post-operative mortality was 38%, and Kuttner's

45%. Taylor reports the post-operative mortality among 63 cases that he has observed as 30%. While these figures give a fairly accurate estimate of the mortality of the past the future promises a great improvement in results, which is already evident from the work of Cushing, who, with the advantage of the teachings of Horsley, Halstead and others, and with a very large previous experience in the treatment of brain tumors, has reduced his post-operative case mortality to 8.4%. At the Peter Bent Brigham Hospital, Boston, during the eighteen months ending last June, Cushing subjected 130 patients to 149 operations with 11 post-operative deaths, which result shows plainly the improvement dependent upon a better understanding of intracranial tumors and a technique adapted to the requirements of cerebral surgery.

The treatment of tumors of parts other than the brain has progressed to a point where the essentials are apparently well defined. We know that tumors of a certain type are benign and others malignant, and we are fairly well informed as to the course various tumors in different locations will follow. From the experience of many surgeons definite indications have been formulated for the eradication of tumors, but this knowledge has been of little assistance in solving the problem of the treatment of brain tumors as the brain differs so radically from other tissues in regard to function, structure, accessibility and response to surgical trauma. Tumors of the brain present a very different aspect than tumors of other tissues for not only must the character of the tumor, whether benign or malignant, be considered, but the effect of the mass in diminishing the intracranial space with the resulting increase of intracranial pressure and impairment of the circulation of blood and cerebrospinal fluid, and the effect of direct pressure of the growth and the increased intracranial pressure on the tracts, centers, and nerves, become factors of even greater importance. The problem is made more difficult because the experience of comparatively few men is available, and because of a lack of systematic study and classification of tumors, secondary changes, operative procedures and results, among cases already treated. Nevertheless, certain characteristics of various types of tumor are evident, and certain operative indications are established.

The most frequent form of intracranial neoplasm is the endothelioma. These tumors are most frequently found in the anterior portion of the upper cranial cavity, but may affect any portion of the brain. They arise from the meninges and are loosely attached to the membrane, sinus or falx at their point of origin, and do not infiltrate brain tissue but displace it by pressure, and form a bed from which they are usually easily removed. Endotheliomata are very vascular and friable. The blood supply is abundant and is derived from the vessels of the meninges which are engorged and dilated for some distance around the point of origin of the tumor. The vascularity of the growth and meninges often leads to a severe and sometimes uncontrollable hemorrhage during the removal of the tumor, and for this reason the mortality following removal is high. The prognosis, after successful removal, is better than of other forms of brain tumor because endotheliomata are relatively benign and do not tend to recur unless the bone has been involved. Tooth gives the ultimate mortality following removal of endotheliomata from the frontal region in 15 cases, as 47%, and from the central region in 9 cases, as 33%; the post-operative mortality for the 24 cases was 25%. Several deaths occurred after a period of some years of relief of intracranial pressure. The surviving 53% of the frontal cases, and 66% of the central cases were satisfactory, and are apparently free from further damage by the growth. Taylor cites six excisions of tumors of the dura—three died from hemorrhage within a few hours, one died of recurrence and two recovered and are well. Ultimate mortality, 66%; post-operative mortality, 50%; successful, 33%.

Gliomata are neoplasms arising in the brain substance from cells of the neuroglia, found in all portions of the brain, and are usually soft, infiltrating, and poorly defined. Gliomata are vascular and are subject to hemorrhages in their substance, and to degenerative changes—as a result they may become cystic. Periods of latency are common, during which time the growth of the tumor ceases and symptoms remain stationary or temporarily subside. Gliomata are found to respond to such disturbance as incision or partial removal, with increased rapidity of growth and malignancy, and it is doubtful if any soft, poorly defined tumor of the brain should be disturbed unless it is causing marked

local symptoms. A decompression alone will probably relieve the symptoms and will give the patient as long a lease of life and comfort as the more radical procedure which excites increased activity on the part of the growth. Gliomata occasionally occur in a hard, more or less encapsulated or degenerated form, and are completely removable. Though the mortality following the removal of gliomata is low compared with that following the removal of endotheliomata, the ultimate mortality is much higher. Thirty-seven gliomata were removed from the forebrain at the National Hospital, and but four of the patients are known to be alive: thirty-three have died; five of sepsis, probably due to brain hernia, and twenty-two of a recurrence of the growth. The post-operative mortality was but 5.4%, but the ultimate mortality was 89.2%, and recovery occurred in but 10.8% of the cases. It must be emphasized that all the cases that eventually died must not be considered as failures, as many of the patients were relieved of distressing symptoms and were given a lease of life that was well worth while living. The average period of survival in these cases was 12.7 months, which compares favorably with the course of a large number of cases that were not operated on but at autopsy a glioma was found. With these, the time from the appearance of the first symptom until death was 10.1 months. Seven gliomata were removed from the cerebellum, with two recoveries.

Fibrous tumors, fibromata and fibrogliomata, though occasionally found in other parts, are the common tumor of the cerebellopontine recess where they arise as firm, pedunculated tumors from the sheaths of the cranial nerves. Like other fibrous tumors, they are benign, and when successfully removed, the patient's recovery is assured. Unfortunately, in this usual location they are not only inaccessible but they exert a gradually increasing pressure on the neighboring structures which include the important centers of the medulla. These structures accommodate themselves to the slow increase of pressure, but when the pressure is suddenly removed, through removal of the tumor, the blood vessels dilate and oedema and hemorrhage follow into these vital centers. The disastrous result is the effect on the respiratory center from which the patient dies of respiratory failure. Certain suggestions of Cushing may be a great factor

in reducing the mortality from this cause. Thirty-six operations for cerebellar tumor were performed at the National Hospital with a mortality of 70.8%. Twenty-four operations were radical and twenty of the tumors removed were of this fibrous type. The result in the seven cases that survived was satisfactory.

Primary sarcoma of the meninges or brain is occasionally met. Meningeal sarcoma resembles an endothelioma in its effect on the brain during the early stage of its growth, but it later invades the brain tissue, and if removed is certain to recur. Sarcoma of the brain may grow for a time as an encapsulated growth and later break through the capsule and involve the brain itself. The prognosis depends on the stage at which it is attacked.

The less frequent forms of tumor are the myxomata, psammomata, osteomata, lipomata and teratomata, while nearly every form of tumor has been observed.

Metastatic carcinoma and sarcoma frequently affect the brain, but as they are a part of a general sarcomatosis or carcinomatosis, treatment is useless. Cysts occur in three forms. The simple, thin walled, traumatic cyst is usually susceptible to complete removal, or to partial removal of the wall and drainage. Sharp and Farrell have very recently called attention to the fact that, in a large proportion of cases of cerebral spastic paralysis, the cause was a hemorrhagic cyst resulting from injuries received during birth. They recommend that children so afflicted, who show ophthalmoscopic signs of increased intracranial pressure, be decompressed, or if possible, the cyst be evacuated or removed. They have operated on sixty-five cases with but six deaths and the results have been very gratifying. The spasticity has greatly diminished, the paralysis has improved, and the checked mental development has been allowed to proceed. Parasitic cysts, echinococcal and hydatid, are easily removed if accessible. Cysts resulting from hemorrhagic or degenerative changes in a tumor, may be removed or drained, and pressure relieved, but the prognosis is poor as cystic tumors are usually gliomatous.

Intracranial tumors arising from, or in the region of, the hypophysis present a rather complex problem. We cannot concern ourselves with the functional disorders of the hypophysis which are, in a measure, amenable to surgical treatment, as they form but a phase in the intricate interrelation of the functions of the

organs of internal secretion. But, when hypertrophic changes in this gland—perhaps in response to perverted function on the part of some other organ—result in a mass that causes symptoms form distension of the sella, or from pressure exerted on structures in the neighborhood of the gland, or when a tumor in the region of the pituitary interferes with its function, the matter then comes within the scope of our discussion.

Cushing states that he is doubtful if the functional hyperplasia of the pituitary, which occurs in early acromegaly, should be attacked by partial removal of the gland if there are no neighborhood symptoms, as the process may become stationary or may pass over into the stage of glandular inactivity, hyperpituitarism passing on to hypopituitarism, which change is similar to that frequently occurring in the thyroid—hyperthyroidism passing into hypothroidism. Cushing also states that this sequence is even more common in the pituitary than in the thyroid. But, when the hyperplastic process distends the capsule of the hypophysis, and causes severe pituitary headache, or when it exerts pressure on the optic chiasm and threatens vision, then decompression, or partial removal of the gland is indicated. Many cases of hypopituitarism are due to tumors at the base of the brain that diminish the functional capacity of the gland by pressure upon it. Cushing states that in sixty-three cases in which these symptoms developed in adult life, the cause was presumed to be a supracellar tumor in thirty-four. The lesion was verified in seventeen cases. There were seven developmental cystic tumors, six developmental solid (mixed) tumors, three endotheliomata and one tuberculoma. Operation is indicated when there are neighborhood symptoms, whether there is evidence of endosecretory disturbance or not. Cushing found neighborhood symptoms present in 101 cases out of 148 regarded as primarily hypophyseal.

The most frequent form of intracranial mass is a granuloma, and while it is not a neoplasm, its effect is the same as that of a true tumor. Tuberculomata are usually multiple, and vary greatly in size and location. They are found most frequently in children, and the common site is in the cerebellar region. They can often be removed but the prognosis is poor as their disturbance is usually followed by a fatal tubercular meningitis. Syphilomata occur as gumma of the meninges and of the brain. The

former often respond to antisyphilitic treatment, but the latter are very resistant and seldom improve. A syphiloma presents as a firm, fibrous encapsulated mass. It is usually superficial and is easily removed.

The operative treatment of a brain tumor consists either of a complete or partial removal of the mass, or of the formation of a defect in the bone and dura so as to allow more room for the contents of the cranial vault. The latter procedure is called a decompression.

There are certain requirements to be observed if the operative result is to be successful. The surgeon must be thoroughly trained in cerebral surgery and must be a master of all the various methods peculiar to this branch of surgery. He must be slow, deliberate and gentle and must be assisted by a staff accustomed to his methods. The anaesthetic must be given by one specially trained in the administration of these difficult, long anaesthesias. There can be no hurry, as it is often necessary to wait for some time for oozing of blood to stop before the operation can proceed. Cushing says "there should be a legal penalty imposed for 'speeding' in brain surgery." The operation should be performed in a hospital completely equipped to meet every emergency. There should be an apparatus ready for artificial respiration, and a donor to furnish blood for a transfusion in case loss of blood has been excessive, wounds must be left dry, and closed without drainage. If the patient is in critical condition he must be left on the operating table for hours before removal to a bed is possible.

Intracranial tumors group themselves according to their site, and the requirements of treatment. Supratentoral tumors are those of the cerebrum and those arising from the meninges of the upper cranial cavity. Access to these tumors is best gained by means of a large osteoplastic flap over the region in which the tumor has been localized. This gives the large exposure that is necessary for manipulation of the tumor, for the control of the hemorrhage and also allows the dural flap to be made sufficiently smaller than the bone flap, so when replaced, it can be accurately sutured. Careful suture of the dura combined with reposition of the whole osteoplastic flap, including the bone, overcomes the possibility of cerebral hernia. A tumor of the dura is removed by excision of the portion of the dura from

which it springs, and when the base is free the tumor usually can be lifted from its bed in the brain tissue, though great care must be taken to control hemorrhage from the dural vessels. A cortical growth that is definitely encapsulated can be enucleated by slow, careful, blunt dissection with blunt instruments, or by pushing the tissue aside with bits of cotton. The hemorrhage can usually be controlled by bits of moist cotton or by the application of pieces of muscle, or fascia, to the bleeding point. The cavity should be thoroughly dry before the wound is closed. A subcortical growth can sometimes be reached and enucleated through an incision in the cortex. A case has been reported where a subcortical tumor has been extruded from the brain, and has forced its way through the incision in the scalp, after a decompression had been done over the site of the tumor. This will not be the method of choice in dealing with this class of tumors as sepsis is inevitable, nevertheless, some way may be found to take advantage of the tendency of subcortical tumors to extrude when the restraining tissue over them is removed. The principle is identical with that employed by Ellsberg for the removal of tumors of the spinal cord. The operation is not complete unless the increased intracranial pressure has been lowered, and if the tumor has not been removed this is best done by a decompression beneath the temporal muscle. When the base of the osteoplastic flap is in the temporal region, it is often possible to cut the bone of the temporal region away below the base of the flap. If this cannot be done, a separate incision must be made above the zygoma; the temporal muscle split in the direction of its fibers and retracted; the bone perforated and removed by a rongeur, and the dura incised, using care to avoid the middle meningeal artery. Three or four square inches of bone should be removed, and the temporal muscle and the skin should be carefully sutured without drainage. A single decompression may not lower intracranial pressure sufficiently to allow the osteoplastic flap to be replaced, and in that case a second decompression on the other side may be necessary or spinal puncture may be done to remove a portion of the cerebro-spinal fluid. Some operators advocate tapping the lateral ventricle instead. The old method of removing the bone from the osteoplastic flap should be abandoned as it is not more efficient than

subtemporal decompression, and it invites the formation of a brain hernia. The cortex cannot be left without some support other than the structures of the scalp. In the temporal region this support is supplied by the temporal muscle, and apponeurosis which give sufficiently to allow the proper expansion.

Subtentoral tumors are those of the cerebellum and of the cerebello-pontine recess. Exposure of the cerebellar region should be made by an incision from mastoid to mastoid just above the superior curved line of the occipital bone and by a medial incision downward from the center of the transverse incision. Hemorrhage is very troublesome and must be carefully controlled. The flaps should be reflected outward, and exposure must include the posterior margin of the foramen magnum. The thin bone of the cerebellar fossa is perforated and completely removed with a rongeur on each side of the skull. There remains the dense bridge of bone extending from the external occipital protuberance to the foramen magnum. The occipital sinus is separated from the under surface of this bridge, and the bridge removed with a Gigli saw. The sinus can then be ligated and severed so as to allow either lobe of the cerebellum to be displaced toward the opposite side. The wide exposure prevents excessive bulging of the cerebellum when the dura is incised, and the lateral displacement of the cerebellum gives much better access to the cerebello-pontine angle. In case the tumor cannot be removed, this procedure results in the best form of decompression for this region. The dura need not be closed and preservation of the bone is not essential as the thick muscles of the neck afford sufficient support. The muscles must be carefully sutured by layers, as primary union is essential. The mortality following cerebellar operations has been very high. Cushing states that the mortality in seventy-seven cases, subjected to all kinds of cerebellar operations at the foreign clinics, was 72.8%. He has so modified his procedure for attack on this region that he has reduced his mortality to 13%. His method is best given in his own words, "The direction of this modification lies, I think, in performing these suboccipital operations with a bilateral exposure, and in one instead of two stages; in carrying through the elaborate approach to the lesion with complete haemostasis, even though it means two hours' labor; in lowering

tension by an occipital puncture of the lateral cerebral ventricle: in removing the posterior half of the foramen magnum, and possibly, in case of great cerebellar herniation through the foramen, the arch of the atlas as well; in being content, in view of the obvious impossibility of total enucleation of the growth, entangled as it is in the vessels and nerves of the lateral recess, with the mere splitting of the comparatively non-vascular lesion with subsequent scooping out, on each side, of as much tumor tissue as possible, leaving its capsule in place, in accurate suture of the wound in layers without drainage; in leaving the patient in the face down position on the table if necessary for hours, should there be the least question of threatened respiratory difficulty; in the willingness to give an entire morning of at least three hours to such an undertaking."

Hypophyseal tumors have been attacked in a number of ways —some operators advocate approach through the frontal or temporal regions, but Cushing, who has had the greatest experience in this work, has adopted the transphenoidal route as the most practical in the large majority of cases as it not only allows sufficient glandular tissue to be removed, but also direct decompression to be done. The procedure consists of separating the upper lip from its attachment to the superior maxilla, elevating the lip and nose so as to expose the cartilaginous septum, the mucous membrane is stripped from each side of the septum, and the cartilaginous and bony septum is removed. The opening between the walls of the septum is then dilated with special dilating plugs which enlarge the opening by compressing the turbinates, a narrow speculum is introduced, and the bulging anterior wall of the sphenoidal sinus is exposed. The character of the hypophysis and sphenoidal sinus as regards shape, size and location, must be determined, previous to the operation by radiographic methods, and with this data in mind, the proper incision is made and the anterior wall of the sinus removed. In simple cases this exposes the enlarged pituitary covered only with a few scales of bone from the thin anterior wall of the fossa, dura, and mucous membrane. As much of the soft, hypertrophied pituitary as is necessary is then scooped out and pressure applied until all bleeding stops. The wound must be left absolutely dry as no drainage is used. The speculum is removed, the sublabial in-

cision closed, and a cigarette drain placed in each nostril to keep the layers of mucous membrane in contact. A supracellar tumor cannot be removed by this method in every case, as the flattened pituitary may intervene, but the relief afforded by a sellar decompression is usually of great value in these cases. Tumors in this region, either of the pituitary itself or supracellar tumors, often extend into the cranial cavity and cause a general increase of intracranial pressure which must be relieved by a subtemporal decompression.

Cushing has performed 125 operations on 114 patients for the relief of pituitary disorders, with ten deaths—a mortality of 10.5%. Subtemporal decompression was done on thirty-three cases and in four instances both sides were decompressed. There were two deaths, twenty of the remaining thirty-one patients were relieved of pressure symptoms, and in a few cases vision was improved. Eleven cases were not helped by the decompression.

A subfrontal or subtemporal attempt was made on the pituitary in thirteen cases. Cushing has not found either of these methods satisfactory. He has performed seventy-four transphenoidal operations on sixty-eight patients: five cases were operated on twice, and one a third time because of continued enlargement of the growth, with a return of chiasmal symptoms. A simple sellar decompression was done on sixteen of these cases, and a sellar decompression combined with the removal of tissue, or the evacuation of a cyst, was done fifty-eight times on fifty-two patients. There were seven deaths from the seventy-four transphenoidal operations—mortality 9.5%. Most of these operations were undertaken for the relief of chiasmal symptoms. Progressively failing vision remained stationary, or improved, in twenty-two instances, and there was a prompt widening of the visual fields and marked improvement of vision in twenty-two other cases. Vision had been completely lost before operation, in five cases, but in two of these it was partially restored. Eight cases were not improved and their condition remains unchanged. Progressive failure of vision continued after operation in three cases but the tissue removed showed malignant change of the lesion from which the patients have since died.

Inaccessible tumors can be treated only by decompression which may give relief for a time if important tracts or centers are

not involved, and if the circulation of the cerebro-spinal fluid is not obstructed.

Cases presenting signs of increased intracranial pressure due to a tumor which gives no localizing signs, should be decompressed. This class of cases gives the best results after decompression, as important tracts and centers are not involved. The relief is often of long duration and later localizing signs may appear, and an attempt may be made to remove the tumor.

The important factor in the successful treatment of cases of tumor of the brain is the early diagnosis and early operation. If an operation is to be done at all, it should be performed before increased intracranial pressure has caused damage which no operation can rectify, for it is not justifiable to prolong life unless life is to be worth living. The positive indications for operation are increasing swelling of the optic disc, optic neuritis, with diminution of visual acuity, unbearable headache, increasing frequency or severity of convulsions, extending paralysis, or pronounced mental changes.

There is always a probability of improvement following an operation for brain tumor, whether the tumor is removed or not. Cushing says, "This, indeed, is more than can be said of most purely exploratory operations performed for new growths involving the abdominal organs, for at the best the closure of a laparotomy wound in the face of an inoperable lesion, leaves the patient's condition unaltered, whereas a properly performed craniectomy is in itself often beneficial.

The present status of the treatment of brain tumors can best be summed up as follows: Cerebral surgery is emerging from the same period of discouraging uncertainty which forms a chapter in the history of abdominal, pelvic, and genito-urinary surgery that is not pleasant to recall in the light of our present knowledge. The chapter deals with the poor results and high mortality dependent on working in ignorance of the fundamental principles. Many mistakes in the past in cerebral surgery are now recognized and can be avoided in the future, many erroneous ideas have been dispelled, and the many limitations of this branch of surgery are recognized and can be respected. The improved results which are sure to come in the future will be in a great measure due

to early diagnosis and early operation, and to strictly limiting the operation to a properly performed decompression in that class of cases which are now recognized on exposure, as irremovable tumors.

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Editorial

We are just at the turning point, at the end of the century, fatigued and exhausted with the appalling accumulation of knowledge which it has set moving. And it is the eternal need for falsehood, the eternal need for illusion which distracts humanity, and throws it back upon the delusive charm of the unknown. Since we can never know all, what is the use of trying to know more than we know already? Since the truth, when we have attained it, does not confer immediate and certain happiness, why not be satisfied with ignorance, the darkened cradle in which humanity slept the deep sleep of infancy? Yes, this is the aggressive return of the mysterious, it is the reaction against a century of experimental research. And this had to be; desertions had to be expected, since every need could not be satisfied at once. But this is only a halt; the onward march will continue, up there, beyond our view, in the illimitable fields of space.

Doctor Pascal EMILE ZOLA.

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Dean Ordway.

The appointment of Dr. Thomas Ordway as Dean of the Albany Medical College is the first step in the reorganization of the College, made necessary by the changes in the standards and methods of medical education. The traditions of the School in maintaining an advanced standing are again preserved by this last action of the

Board of Trustees, one of the most difficult and most public spirited acts they have ever been called upon to perform. For the first time since its organization the College stands in need of public support, and the Board has generously underwritten a financial obligation rather than lose to Albany one of its most honored institutions.

The assumption of this burden demands closer scrutiny on the part of the Trustees than has heretofore been necessary. Of the long line of eminent men who have presided over the meetings of the Faculty Dr. Ordway is the first to receive his appointment directly from the Board, as their representative and executive officer. His predecessors have been chosen by the Faculty from their own number, as a mark of distinction and seniority. Dr. Alden March, the founder of the College, was President of the Faculty from 1839 until his death in 1869. He was succeeded by Dr. James McNaughton, who held the office until 1874. Dr. James H. Armsby, the first professor of anatomy, and also for many years curator of the Museum, held the office in 1874. Upon the death of Dr. Armsby, Dr. Thomas Hun became Dean in 1875. Dr. Hun was then Emeritus Professor of the Institutes of Medicine. Upon his death in 1896, Dr. Albert Vander Veer was elected Dean, and resigned the office in 1903, as incompatible with his membership in the State Board of Regents. He was followed by Dr. Samuel B. Ward, who resigned in 1913, on account of poor health. Dr. Willis G. Tucker accepted provisionally the title of Acting Dean in 1913, and of Dean in 1914, and has recently retired in favor of Dr. Ordway. The connection of Dr. Tucker with the College has been exceptional. Covering a half-century, it has been more intimate than that of any other man. His name first appears in the list of students in the catalogue of 1867-68; and later as a member of the Faculty, from 1874 to the present time. In 1883 he became Registrar, and continued the administrative officer until he accepted promotion to be Dean. His marvellous recollection of faces and names is always in evidence on alumni day, when his prompt recognition of returning graduates and cordial greetings have long been a feature of the reunions.

Dr. Ordway is exceptionally qualified for the responsibilities he now assumes. He graduated from Harvard University in

1900, and for certain biological and chemical work received the degree of Master of Arts in 1901. He graduated in medicine from the Harvard Medical School in 1905, and was then made assistant to Dr. F. B. Mallory of the Boston City Hospital, completing two years of service as interne in 1907. He was also assistant in pathology to Dr. W. T. Councilman. In 1909 Dr. Ordway was appointed Director of the Bender Hygienic Laboratory, succeeding Dr. George Blumer and Dr. Richard Mills Pearce, who had already established the laboratory upon a high scientific plane. Dr. Ordway sustained the reputation made by his predecessors, and was particularly happy in the administrative part of his work. In November, 1911, he left Albany to accept the appointment of Physician-in-Charge of the Huntington Hospital of the Cancer Commission of Harvard University and was made Lecturer in Pathology in the Graduate School of Medicine. In 1913 he became Instructor in Medicine and a member of the Faculty of the Harvard Medical School, and by special appointment of Harvard University was sent to London, Paris and some of the German cities to investigate the clinical status of radium. The regret felt by Dr. Ordway's many professional friends when he left Albany is now relieved by his return, and the personal relations he established here four years ago bespeak for him a cordial reception and heartiest co-operation.

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The Medical Department of Union University.

The resounding title under which the College has prospered for forty years is now to become an established fact rather than a "scrap of paper." Expert study of medical schools during the last few years has raised the vital question as to whether such institutions may be properly conducted without liberal endowment and university affiliation. In a spirit of good faith, and looking to the co-operation of the Rockefeller and Carnegie Foundations, the Trustees of the College have taken the first step toward closer association with Union University. The organic act of 1874 is a permissive statute, establishing only a name and restricting the Governors of the University in their control of the Medical Department. Steps to assure an impartial supervising body were taken by the Board

of Trustees on April thirteenth, by the election of four governors of Union University to membership. These new members, all residing in New York, are the Reverend Dr. George Alexander, long a professor in Union College, and at one time its *ad interim* president; Dr. Edgar S. Barney, principal of the Hebrew Technical Institute of New York; Professor Franklin H. Giddings of Columbia University, and Courtland V. Anable, Esq., one time tutor of mathematics at Union, and now a practicing attorney in New York. The Board was further strengthened by the addition of Mr. James C. Farrell of Albany, leaving one vacancy to be filled.

The Executive Committee of the Trustees of the Albany Medical College now consists of: Hon. Simon W. Rosendale, President of the Board of Governors of Union University; Hon. Alden Chester, a member of the same Board; Mr. Robert Olcott, Treasurer of the Albany Medical College funds; Mr. Luther H. Tucker, Secretary of the Board of Trustees; Hon. Amasa J. Parker, Vice-President of the Board of Governors of the University; Mr. Edmund N. Huyck, Mr. Charles Gibson, Hon. James B. McEwan, Reverend Dr. Alexander, Dr. Barney, Mr. Anable, Professor Giddings and Chancellor Richmond.

An organization has thus been effected to perfect the alliance between the medical school and other departments of the University. Under the technical direction of Dean Ordway, a bright future may be anticipated and full development attained of the cortical and clinical resources of a city long known as one of the progressive medical centres of the country.

Public Health

Edited by Arthur Sautter, M. D.

DEPARTMENT OF PUBLIC SAFETY, BUREAU OF HEALTH, ALBANY, N. Y.
ABSTRACT OF VITAL STATISTICS, MARCH, 1915
COMPILED BY WILLIAM F. FELLGRAFF, REGISTRAR.

Deaths.

Consumption	21
Typhoid fever	2
Scarlet fever	0
Measles	1
Whooping cough	3
Diphtheria and croup	0

Grippe	12
Diarrheal diseases	1
Pneumonia	30
Broncho-pneumonia	6
Bright's disease	27
Apoplexy	9
Cancer	14
Accidents and violence	10
Deaths under one year	25
Deaths over 70 years	58
Total deaths	218
Death rate	23.32
Death rate less non-residents	19.90

Deaths in Institutions.

	Resident	Non-Resident
Albany Hospital	8	12
Child's Hospital	1	0
County House	5	4
Home for the Friendless	0	1
Homeopathic Hospital	1	10
Hospital for the Incurables	0	1
Little Sisters of the Poor	1	1
Public places	2	3
Sacred Heart Convent	0	1
St. Margaret's House	4	0
St. Peter's Hospital	4	7
Maternity Hospital	1	2
Federation of Labor Pavilion	2	0
Albany Hospital Camp	2	2
	31	44
Births		205
Still births		9

TUBERCULOSIS.

Bender Laboratory Report on Tuberculosis.

Positive		14
Negative		55
Total		69
Living cases on record March 1, 1915		386
Cases reported:		
By card	30	
Dead cases by certificate	4	
		34
Total		420

Dead cases previously reported	17	
Dead cases not previously reported	4	
Duplicates	2	
Removed	1	
		24
Living cases on record April 1		366
Total tuberculosis death certificates filed during March		21
Non-resident deaths:		
City at large	1	
C. F. L. Pavilion	2	
Albany Hospital Camp	2	
		5
Resident deaths		16

Report of Visiting Tuberculosis Nurse

Old cases	6
New cases	25
Returned from hospitals	3
Total	34
Disposition of cases:	
Died	4
Sent to hospitals	11
To general tuberculosis nurse	13
Left town	1
Remaining under treatment	5
Total	34
Visits made	30
Visits made, old cases	198
Calls at Board of Health Office	25

Bureau of Contagious Disease.

Cases Reported During March, 1915.

Typhoid fever	5
Scarlet fever	30
Diphtheria and croup	11
Chickenpox	20
Measles	12
Whooping-cough	33
Tuberculosis	34
Total	145

Communicable Disease in Relation to Schools.

	Reported		
	D.	S.F.	M.
Public School No. 1	..	1	..
Public School No. 6	1	..	..
Public School No. 7	..	2	..
Public School No. 9	..	1	..
Public School No. 10	1	..	..
Public School No. 11	..	2	..
Public School No. 12	1	..	..
Public School No. 14	1	2	..
Public School No. 15	..	1	1
Public School No. 17	..	1	..
Public School No. 18	1	..	..
Public School No. 21	..	1	..
Cathedral School	..	..	1

Number of days quarantine for diphtheria:
Longest..... 23 Shortest..... 12 Average..... 18 2/6
Number of days quarantine for scarlet fever:
Longest..... 54 Shortest..... 30 Average..... 34 1/5

Fumigations:
Houses..... 71 Rooms..... 329

Cases of diphtheria reported	11
Cases of diphtheria, antitoxin used	10
Cases of diphtheria, antitoxin not used	1
Deaths after use of antitoxin	0

BUREAU OF PATHOLOGY.

Bender Laboratory Report on Diphtheria.

Initial positive	16
Initial negative	215
Release positive	13
Release negative	68
Suspicious	2
No growth	1
Total	315

Test of Sputum for Tuberculosis.

Positive	14
Negative	55
Total	69

Widal tests:	
Positive	5
Negative	47
Suspicious	4
Unsatisfactory	3
Total	59
Milk analyses	32
Water analyses	1
Wasserman reactions	4

BUREAU OF MARKETS AND MILK.

Public market inspections	24
Market inspections	171
Fish market inspections	6
Packing house inspections	3
Rendering plant inspections	2
Slaughter house inspections	4
Hide house inspections	3
Milk depots inspected	14
Milk depots deficient	2
Milk wagons inspected	35
Milk wagons unclean	2
Milk cans inspected	144
Milk cans unclean	12
Milk cans condemned	3
Dairies inspected	5
Cows re-examined	195
Lactometer tests	32
Temperature tests	32
Fat tests	54
Fat tests below standard	5
Sediment tests	12
Chemical tests	4
Bacterial examinations	32
Slaughter house deinfected	1
Special inspection, measles	3

MISCELLANEOUS.

Work certificates issued to children	16
Number of complaints of nuisances	62
Privy vaults	3
Closets	1
Plumbing	10
Other miscellaneous complaints	48
Number of dead animals removed	592
Cases assigned to health physicians	71
Calls made	192

Medical News

Edited by Arthur J. Bedell, M. D.

Albany Guild for the Care of the Sick.—Department of Visiting Nursing.—Statistics for March, 1915.—Number of new cases, 208; classified as follows: Dispensary patients receiving home care, 26; district cases reported by health physicians, 2; charity cases reported by other physicians, 61; moderate income patients, 87; metropolitan patients, 32; old cases still under treatment, 531; total number of cases under nursing care during month, 739. Classification of diseases for the new cases: Medical, 31; surgical, 9; gynecological, 4; obstetrical under professional care, mothers 50, infants 50; eye and ear, 1; skin, 1; infectious diseases in the medical list, 62. Disposition: Removed to hospitals, 13; deaths, 38; discharged cured, 116; improved, 25; unimproved, 4; number of patients still remaining under care, 543.

Special Obstetrical Department.—Number of obstetricians in charge of cases, 2; students in attendance, 4; nurses in attendance, 3; patients carried over from last month, 1; new patients during month, 5; patients discharged, 5; visits by attending obstetrician, 5; by students, 50; by nurses, 54; total number of visits for this department, 109.

Visits of Guild Nurses (all departments).—Number of visits with nursing treatment, 1,378; for professional supervision of convalescents, 669; total number of visits, 2,047; pay cases, 769; charit ycases, 609; unrecorded cases, 669; cases reported to the Guild by 2 health physicians, and 45 other physicians; graduate nurses 8, certified nurses 1 pupil nurses 7 on duty.

Dispensary Report.—Number of clinics held, 77; new patients, 166; old patients, 488; total number of patients treated during month, 654. Classification of clinics held: Surgical, 12; nose and throat, 7; eye and ear, 13; skin and genito-urinary, 6; medical, 7; lung, 8; dental, 0; nervous, 2; stomach, 3; children, 9; gynecological, 8.

Medical Society of the County of Albany.—The regular monthly meeting of the Medical Society of the County of Albany was held at the Elks Club, Thursday evening, April 22, 1915, at 8.30 p. m. The following program was presented: Dr. F. C. Conway presents cases of: Bilateral athetosis; Multiple Sclerosis, Erb's Spinal Paralysis, Cerebellar (peduncular) lesion; Dr. J. P. O'Brien and Dr. A. J. Bedell, "Exhibition of a cured case of pulsating exophthalmos;" Dr. A. J. Bedell, "Substitutes for simple enucleation—demonstration;" Dr. E. Kellert, presentation of pathological specimens: I, Megacolon; II, Experimental tuberculosis of a guinea pig; III, Aortic aneurysm; IV, Lesions of foot and mouth disease; Dr. E. L. Draper, "Report of a case of aberrant thyroid;" Dr. J. N. Vander Veer, lantern slide exhibition of cystoscopic pictures.

Medical Society of the County of Schenectady.—The regular meeting of the Medical Society of the County of Schenectady was held in the rooms of the Society in the New County Building on Tuesday evening,

April 13, 1915, at 8.30 P. M. Scientific program: "Alveolar Infection," Dr. D. R. Kathan, discussion led by Dr. Paul Mair, D. D. S.; "A Clinical Study of Cardiac Neuroses," Dr. N. A. Pashayan, discussion led by Dr. L. Betts; "Post-operative treatment in Surgical Cases," Dr. J. H. Collins, discussion led by Dr. W. P. Faust; "The Treatment of Uterine Fibroids with X-rays," Dr. C. B. Witter.

PAN-AMERICAN CONGRESS TO MEET.—The seventh Pan American Congress will meet in San Francisco, June 17 to 21, inclusive. It assembles pursuant to invitation of the president of the United States issued in accordance with an act of Congress approved March 3, 1915.

The countries and colonies embraced in the Congress are the Argentine Republic, Bolivia, Brazil, Canada, Colombia, Cuba, Chili, Costa Rica, El Salvador, Ecuador, Guatemala, Honduras, Haiti, Hawaii, Mexico, Martinique, Nicaragua, Panama, Paraguay, Peru, Santo Domingo, United States, Uruguay, Venezuela, British Guiana, Dutch Guiana, French Guiana, Jamaica, Barbadoes, St. Thomas and St. Vincent. The organization of the Congress is perfected in these countries and the majority of them have signified their intention to be represented by duly acredited delegates. The Congress will meet in seven sections: (1), Medicine; (2), Surgery; (3), Obstetrics and Gynecology; (4), Anatomy, Physiology, Pathology and Bacteriology; (5), Tropical Medicine and General Sanitation; (6), Laryngology, Rhinology and Otology; (7), Medical Literature.

All members of the organized medical profession of the constituent countries are eligible and are invited to become members. The membership fee is $5 and entitles the holder to a complete set of the transactions. Advance registration are solicited and should be sent with membership fee to the treasurer, Dr. Henry P. Newman, Timken Building, San Diego, Cal. The Palace Hotel will be headquarters. The first Pan-American Medical Congress was most successfully held in the United States in 1893.

ANNUAL REPORT OF STATE HEALTH DEPARTMENT.—Dr. Herman M. Biggs, State Commissioner of Health, has transmitted the thirty-fifth annual report of the State Department of Health to Governor Whitman. The report is mainly occupied in pointing out that the department has set for itself the task of saving 25,000 lives during the next five years, that 10,000 lives might be saved annually and that 100,000 cases of serious illness could be prevented together with all the economic loss involved (some $30,000,000). Dr. Biggs proposes to initiate a campaign of education for the purpose of reducing the death rate among those over 45 years of age due to diseases of the blood vessels, heart, kidneys and brain. In closing his letter Dr. Biggs says that it remains for the legislature and the executive to decide how far the citizens of the State shall have the benefits in prolonged and effective life which science and experience can give them.

Oversupply of Hospital Trains in Germany.—A Berlin exchange announces that hospital trains have been equipped by various organizations, municipalities, and private beneficence, now number over 150 and far exceed the demand. Some of these trains stand unused on the sidings for weeks at a time and hence the Red Cross calls a halt on further donations of the kind saying that the capital could be used to better advantage.

Widows' Pensions.—The New York Legislature has passed the Widow's Pension Bill granting "allowances" not to exceed the amount or amounts it would be necessary to pay to an institutional home for the care of the widow's children. They must be suitable to bring up their children, must have been residents of the county two years preceding the application for allowance and their husbands must have been citizens of the United States and residents of the State before death. The law contains a provision not found in laws in other states "that if such aid is not granted the child or children must be cared for in an institutional home." This, if strictly interpreted would restrict the number eligible for allowances. The administration of the law is placed in the hands of the local board of child welfare in each county.

Saratoga Springs Medical Society.—The regular meeting of the Saratoga Springs Medical Society was held at Newman's Lake House, at 9 p. m., Friday, April 23rd. The following papers were read: "Congress Spring and the hydraulics of the mineral water reservoir," Dr. A. W. Ferris; "Organo-Therapy," Dr. D. C. Moriarta.

A Law Against Division of Fees.—The Kansas Senate has passed unanimously a bill prohibiting surgeons paying commissions to physicians who may send patients to them, or advise patients to go to them for treatment or operations. However, the bill specifically states that it shall not be unlawful for the attending physician to receive a fee from the surgeon or specialist for services actually performed in case the patient is informed in advance as to the amount of fee which the physician is to receive.

A Proposed Amendment to the Massachusetts Medical Law.—The Massachusetts State Board of Registration in Medicine has requested the legislature to amend the registration law so that hereafter all applicants for examination shall hold the degree of M. D. conferred by a legally chartered medical school. All but three states in the Union demand a degree in medicine as a prerequisite to examination but Massachusetts allows anyone to take the examination if of good moral character, 21 years of age and willing to pay the fee of $20.

United States to Take Charge of Quarantine in New York City.—After attempts for twenty-five years by the Academy of Medicine and other bodies to have the United States take charge of the quarantine station at New York, it is now announced that the Public Health Service will soon assume control of the plant at Quarantine.

Boylan Law Strengthened.—At the conference between delegations interested in the drug crusade in New York City and representatives of the State Board of Pharmacy and the State Pharmaceutical Society a compromise anti-drug bill was agreed upon which will strengthen the Boylan law. Under the new bill, which is called the Bloch bill, a druggist can refill a prescription containing a habit forming drug only for the person for whom it was originally compounded. Physicians must make a physical examination of a patient before giving him a drug cure. A bill to prevent the use of habit forming drugs in patent medicines will be urged next year by Howard Clark Barber, superintendent of the Society for the Prevention of Crime.

Rockefeller Institute for the Study of Animal Diseases.—The establishment of an institution for scientific research in animal diseases has been made possible by the signing of a bill recently passed by the New Jersey Legislature. The institution will be located near Princeton conducted by the Rockefeller Institute and under the charge of Dr. Theobald Smith (A. M. C. '83).

The Coroner System of New York City Abolished.—A bill abolishing the office of coroner in New York City has been signed by Governor Whitman and the mayor of the city is to appoint a chief medical examiner who in turn appoints two assistants to perform the work formerly done by the coroners. The new law goes into effect when the terms of the present coroners expire. Eleven coroners and the same number of coroners' physician are affected by this change.

Surgeon General Gorgas.—Surgeon General Gorgas has been offered by the trustees of the Rockefeller Foundation the position of advisor in problems of public health. If he accepts he will be obliged to retire from the army, though not necessarily to resign, unless he is sent to Siberia, in which, being belligerent territory, he would probably be unable to work even in the saving of life while a retired army officer.

Personals.—Dr. James N. Vander Veer (A. M. C. '03), Albany, has been elected a member of the American Urological Society at its recent meeting.

—Dr. John P. Faber (A. M. C. '05), Schenectady, N. Y., was re-elected president of the Schenectady Committee on the Prevention of Tuberculosis of the State Charities' Aid Association at its meeting, March 5, 1915.

—Dr. George W. Papen (A. M. C. '05), Albany, has removed from 268 to 349A Madison Ave., Albany, N. Y.

—Dr. Nelson K. Fromm (A. M. C. '08), Albany, has removed to 216 State St.

—Dr. John Waluk (A. M. C. '14), is engaged in active practice at 69 S. Third Ave., Brooklyn, N. Y.

Married.—Dr. Ralph B. Post (A. M. C. '11), Ravena, N. Y., and Miss Frances G. Gray, were married at Albany, N. Y., April 21, 1915.

—Dr. Burke Diefendorf (A. M. C. '13), Hillsdale, N. Y., and Miss Bertha A. Mann were married at Troy, N. Y., April 20, 1915.

Died.—Dr. John L. Perry (A. M. C. '62), widely known as one of the proprietors of the United States Hotel at Saratoga Springs, died at Baltimore, Md., April 13, 1915, aged 75.

—Dr. Albert S. Newcomb (A. M. C. '66), a member of the New York Academy of Medicine, formerly medical examiner for the New York Postoffice and local surgeon for the West Shore Railroad; for a time surgeon of the Twenty-fourth Infantry, N. G. N. Y., died at his home in Schenectady, March 1, 1915, from heart disease, aged 73.

—Dr. Edwin Crocker (A. M. C. '68), a member of the Medical Society of the State of New York and a practitioner and druggist of Narrowsburg, N. Y., died at his home, March 26, 1915, aged 75.

—Dr. Orris E. Herrick (A. M. C. '71), a Fellow of the American Medical Association and president of the Grand Rapids Academy of Medicine, for many years consulting gynecologist to St. Mark's and the Union Benevolent Association hospitals, Grand Rapids, a member of the Michigan State Board of Health in 1885, professor of gynecology in Cincinnati Medical College in 1878 and editor of the *Obstetric Gazette*, died in the DeVore Sanatorium, Grand Rapids, March 5, 1915, from cerebral hemorrhage, aged 66.

Current Medical Literature

REVIEWS AND NOTICES OF BOOKS

A Text-Book of Diseases of the Nose and Throat. By D. Braden Kyle, A. M., M. D., Professor of Laryngology and Rhinology, Jefferson Medical College, Philadelphia. Fifth edition, Thoroughly revised and enlarged. Octavo of 856 pages with 272 illustrations, 27 of them in colors. Philadelphia and London: W. B. Saunders Company, 1914. Cloth, $4.50 net.

In the fifth edition of his well known book, the author has followed the same general plan. The following new articles have been added: Vaccine Therapy; Lactic Bacteriotherapy in Atrophic Rhinitis; Salvarsan in the Treatment of Syphilis of the Upper Respiratory Tract; Spheno-

palatine Ganglia Neuralgia; Negative Air-pressure in Accessory Sinus Disease; Chronic Hyperplastic Ethmoiditis; Congenital Insufficiency of the Palate; Lactic Bacteriotherapy in Pharyngeal Affections; and an article describing the Removal of a Plate of Artificial Teeth from the Esophagus. Under diagnosis, pathology and treatment, all systemic conditions in their relation to the special diseases of the nose and throat, have been thoroughly considered.

While the book is perhaps rather advanced for students, it is up to date and a good reference book for physicians.

C. F. T.

Medical Electricity and Rontgen Rays and Radium. By SINCLAIR TOUSEY, A. M., M. D., Consulting Surgeon to St. Bartholomew's Clinic, New York City. Second edition, thoroughly revised and enlarged. Octavo of 1,219 pages, with 798 practical illustrations, 16 in colors. Philadelphia and London: W. B. Saunders Company, 1915. Cloth, $7.50 net; half morocco, $9 net.

In this, the second edition of Dr. Tousey's work, over 100 pages of new matter have been added, and fifty new illustrations. The book now contains over 1,200 pages, 600 of which are devoted to the subject of electricity, 475 to the rontgen ray, about fifty to radium and thirty to phototherapy.

It is impossible for a reviewer to read and digest such a mass of information. Quotations from the publishers are as follows: "Such new matter as diathermy, sinusoidal currents, radiography with intensifying screens, rontgenotherapy, the Coolidge and similar rontgen tubes, Tousey's own dosage, and radium therapy. Machado's tabular classifications of electric methods, effects and uses have also been included—every advance in the use of these modern therapeutic agents."—"Dr. Tousey's work is complete."—"Nothing is taken for granted; every detail is explained from reading the radiogram down to the formula of the soldering compound used in making wire connections."

Altogether, the book is a monumental work of "Detail"—a valuable addition to the library of the specialist or expert. J. M. B.

MEDICINE

Edited by Samuel B. Ward, M. D., and Charles K. Winne, Jr., M. D.

A Clinical Consideration of Hodgkin's Disease.

J. L. Yates. *Bulletin of The Johns Hopkins Hospital, June, 1914, Vol. XXV, No. 280, Page 180.*

Yates, like Bunting, believes that Hodgkin's disease may be considered an infectious, non-contagious affection due to the Bacterium Hodgkini. It is characterized by a somewhat variable, though definite, reaction in the lymphatic and perilymphatic structures, specific changes in the blood

picture and by the manifestation of little or no tendency to spontaneous recovery.

It appears to the author that these cases clearly indicate that primarily Hodgkin's disease is a localized process, susceptible of cure when properly treated as a malign, though chronic infection. It may persist for years without manifesting itself save in the blood picture so that cures may not be assumed until after an uninterrupted duration of years of persistently normal conditions.

A sovereign remedy for all cases is not now conceivable. At present the greatest need is some therapeutic agency to control glands not directly accessible; for once extension, which may occur early, has reached either the thorax or abdomen the prognosis becomes relatively, if not absolutely hopeless.

Does the Internal Administration of Potassium Iodide Have any Effect on Thyroid Grafts in Guinea Pigs?

CARROLL SMITH. *The Journal of Medical Research, May* 1914, *Vol. XXX, No. 2, Page* 113.

The relation of iodine in its various forms to the changes in thyroid tissue has been investigated by Marine in conjunction with Lenhart and Williams. They made a very thorough study of the histology of normal and goitrous thyroids and observed the effect of iodine on the glands. These authors worked especially on dogs and came to the following conclusions: They divide thyroid glands into normal, colloid, and hyperplastic glands. When the iodine intake is lessened they show that the thyroid tends to undergo hyperplasia. They maintain that iodine given to an animal with a hyperplastic gland causes the structure to become a colloid gland within two or three weeks.

Marine claims that a colloid gland is that form of thyroid most nearly related to the normal gland to which a hyperplastic gland can revert. He states that there seems to be a minimum amount of iodine necessary to maintain a normal gland structure, and when the amount falls below this minimum, hyperplasia begins. There is a progressive decrease in the iodine content in the thyroid from normal glands through the various stages of hyperplasia. In other words, the amount of iodine and the degree of thyroid hyperplasia vary inversely in relation to each other. The author further claims that thyroid hyperplasia is a physiological reaction to the needs of the body and is analogous to regeneration after partial thyroidectomy.

Smith, having in mind this work of Marine's and other investigators, attempted to find out if in thyroid glands the administration of potassium iodide would in any way tend to overcome the thyroid need after partial thyroidectomy, as claimed by Marine, and thus prevent or retard the growth of the grafts which Cristiani states is controlled by the need.

Some fifty-four animals, with 162 grafts, were used in these experi-

ments, and the author was able to recover successful grafts in a great majority of the animals. Some young grafts were studied in order to observe the early regeneration of the tissue. The younger grafts showed a central necrosis, with only the peripheral thyroid tissue persisting. The central necrotic area became gradually replaced by a growth of connective tissue from the periphery. In the older grafts the thyroid tissue appeared normal, except for the presence of increased connective tissue. In some cases there seemed to be relatively more connective tissue in the animals which were given potassium iodide than in the controls, but the condition was not constant.

The author asserts that no conclusions can be drawn from his experiments as to the condition of the homeo-transplants. From his investigations he believes that the administration of potassium iodide to a guinea pig in which a piece of its own thyroid gland has been transplanted does not have any marked effect on the behavior of the graft. He did not find atrophy of the grafts, as reported by Cristiani, after the use of thyroid tablets. Second, he believes that thyroid grafts show early central necrosis. The peripheral acini only remain intact. Regeneration takes place by the growth of thyroid tissue from the peripheral acini towards the center. These findings, he states, agree with those of von Eiselsberg, Sultan, Cristiani, and Enderlen.

Studies in Anaphylaxis. (A study of the cellular theory by the graphic method.)

RICHARD WEIL. *Journal of Medical Research, May, 1914, Vol. XXX, No. 2, Page 87.*

In this study of anaphylaxis the author endeavors to determine whether reaction occurs within the cells of the body, as is believed by some, or in the fluids, as has been claimed by other observers. To clear up these disputed points he has carried out a long series of experiments, and beginning he points out the fact that guinea pigs which have been injected with the serum of a rabbit immunized against a foreign proteid become hypersentitive to that proteid. In previous experiments by Dale it has been shown that the uterus of a guinea pig which has been passively sensitized by this device, making use of the serum taken from an immunized guinea pig, presents exactly the same anaphylactic reaction as does that of an actively sensitized animal.

From his study, the author concludes as follows:

I. The uterus of a hypersensitive guinea pig responds in a characteristic manner upon the addition of the antigen (Schultz-Dale).

II. The presence of immune bodies in the blood of the guinea pig, whether in small or in large amounts, does not lead to the slightest response upon the addition of antigen to the uterine preparation.

III. Desensitization of the living guinea pig after active sensitization desensitization is complete the uterus fails entirely to react upon the addition of the antigen; if incomplete, the uterine contraction is correspondingly enfeebled and sluggish.

IV. The uterus removed from an actively sensitized guinea pig which has been killed in anaphylactic shock may either fail to respond or may give a somewhat impaired response. From the latter observation the conclusion is drawn that a sensitive animal may be killed by an amount of antigen considerably less than would be required to saturate the antibody content of the animal.

V. In passively sensitized guinea pigs it is shown that the dose of immune serum sufficient to prepare the guinea pig for a fatal anaphylactic shock induces a uterine condition in which the addition of antigen leads to a typical response. Smaller amounts, which in vivo prepare the guinea pig for a moderate reaction, give, as an analogous result, a proportionally diminished response in the uterine preparation.

VI. Desensitization of the passively sensitized guinea pig deprives the uterus of its power of response.

VII. The gradual and spontaneous loss of sensitiveness by the passively prepared guinea pig is accompanied *pari passu* by a loss on the part of the uterus of its capacity to respond to the antigen.

VIII. This loss precedes the development of an anaphylactic condition towards the heterologous (rabbit) immune serum employed, exactly as in the living animal.

IX. These data lead to the following generalizations:

(A) The anaphylactic condition is entirely dependent upon the sensitization of the cells of the body.

(B) All conditions which in any way influence the degree of sensitiveness of the cells in the same degree alter the anaphylactic state, or sensitiveness, of the animal.

(C) The presence of immune bodies in the blood, whether in small or in large amounts, does not in the slightest degree contribute towards the production of the anaphylactic response in the guinea pig.

SURGICAL PATHOLOGY.

Edited by George E. Beilby, M. D.

The Peripheral Origin of Surgical Shock.

Frank C. Mann. *Bulletin of The Johns Hopkins Hospital, July,* 1914, *Vol. XXV, No.* 281, *Page* 205.

It occurred to the author in undertaking this study on surgical shock that despite the enormous amount of work that had been done along this line, there was still among recent writers no general agreement as to the cause and nature of the condition. He found in a critical review of the literature an astounding amount of contradictory experimental data and a great number of diverse conclusions based thereon. This condition of the subject was the author's reason for undertaking the present investi-

gation. He endeavored, first, to determine definitely what is and what is not shock. Second, to settle as nearly as possible the chief questions in dispute. Third, either to correlate and harmonize the separate conclusions arrived at by the methods just described into a comprehensive theory of shock, or else to define as nearly as possible the limits of our present knowledge.

The data which the author has presented seems to justify the following conclusions:

1. It is impossible to reduce the anesthetized animal to a state of shock by any degree of sensory stimulation, provided all hemorrhage is prevented and its abdomen is not opened.

2. They were unable to show that acapnia is a primary factor in the production of shock.

3. Shock is not due to disturbance of the respiration, but the respiratory center is more quickly injured than any other vital center by shock.

4. The vaso-motor center is not depressed nor fatigued in shock. It is the most resistant of all the vital centers. The peripheral and untraumatized visceral arteries are constricted in shock.

5. Shock is not due to primary failure of the heart nor to involvement of the cardio-inhibitory or cardio-accelerator mechanism.

6. It is possible to produce the signs of shock by the use of excessive heat or cold.

7. The easiest and most certain method of producing shock is by exposure and traumatization of the abdominal viscera. This, judging from the literature, has been the method used by nearly all investigators of shock.

8. Shock produced by exposure and trauma of the abdominal viscera is not due alone to a paralysis of the vaso-motor mechanism of the splanchnic area. This has been shown by two crucial experiments. (1) Section of the cord or splanchnic nerves does not produce shock. (2) When all the abdominal and thoracic organs are taken from the animal (Carrel) this "visceral organism" can still be kept alive for many hours, and it can digest food, excrete urine, etc. Therefore, some other cause than vaso-motor paralysis or inhibition is involved.

9. The cause of shock is the tremendous loss of red cells and fluid from the blood, due to the reaction of the great delicate vascular splanchnic area to irritation—an acute inflammation of the peritoneum, due to trauma and exposure to the air and changes of temperature. The great amount of this loss is apparent when it is taken into consideration that the peritoneum has an extent as great as the entire cutaneous surface of the body. The factors involved in this reaction to irritation are the same as those involved in any other local inflammatory process, and certainly do not involve the nervous system to any greater extent. The profound general effect is due to the actual loss of red cells and fluid from the circulating blood through stasis, diapedesis, exudate, endothelial changes, etc. It is to be noted that some of the classical descriptions of

inflammation were made from observations on the exposed omentum and mesentery. In the course of operations in which the abdomen has not been opened, a loss of fluid and cells from the blood occurs. But the loss is, except when great areas of subcutaneous tissue have been exposed, comparatively unimportant.

10. Certain accessory factors which help to produce the condition of shock should be mentioned. These are muscular relaxation, decrease in intra-abdominal pressure and impaired respirations, all of which tend to decrease the amount of blood returned to the heart. The effect of chills and the use of hot applications should be considered.

11. Degenerative changes in the cells of the central nervous system are the result and not the cause of shock. Dolley states that identical changes in the nerve cells are produced by hemorrhage and shock.

12. General anesthesia of moderate depth prevents painful impulses from affecting the nerve cells of the central nervous system. Nerve blocking under such conditions is useless, so far as the prevention of shock is concerned.

13. A relatively slight decrease in blood supply may be sufficient to depress markedly the cells of the cerebral cortex. Care should, therefore, be taken to exclude this factor before ascribing such depression to inhibition.

14. The use of the word "shock" should be avoided, and instead an accurate and detailed description of the patient's condition should be given. If the term be used at all it should be applied to the condition in which, without any grossly discernable hemorrhage having occurred, the amount of circulatory fluid is greatly diminished on account of stagnation of the blood in the smaller veins and capillaries or by exudation of the fluid and cellular elements of the blood from the same.

The Significance of the Thymus Gland in Graves' Disease.

WILLIAM STEWART HALSTED. *Bulletin of the Johns Hopkins Hospital, August*, 1914, *Vol. XXV, No. 282, page 223.*

Dr. Halsted has long been impressed by the interrelation of the various ductless glands and particularly the relation of the thymus to the thyroid gland and its bearing upon the various symptoms which are classed as being those of Graves' disease. This article forms a valuable contribution to our knowledge of the subject.

Halsted states that from the facts gleaned at the autopsy table, from experiments on animals, and above all, from the results following primary thymectomies, they have convincing evidence that the thymus gland may play an important part in Graves' disease, and in some cases assume the title rôle. Some of the most puzzling features of the dis-

ease are made possible of interpretation by the discovery of the influence which the thymus may exert. He believes that there is little doubt that the secretions of the two organs concerned in the production of the Basedow picture have a relationship. Antagonistic factors are also at work in the two glands, the presence of which is indicated sometimes directly and sometimes indirectly by the behavior of other organs.

A number of cases are cited from his own practice and also from that of other surgeons, bearing out his views that the hyperplastic thymus in exophthalmic goitre may display an action essentially similar to that of the thyroid and that the thymus persistens aggravates the symptoms of the disease.

Primary thymectomies uncomplicated by strumectomy, and secondary thymectomies in cases not sufficiently relieved by resection of both lobes, of the thyroid would be the operations of choice for those searching for the essence of the Basedow thymus. The combined operation would be avoided by them as much as possible until it became more definitely known how profoundly and in what particulars the thymus may influence the disease.

Clinical Study of Primary Carcinoma of the Fallopian Tube.

Cecil W. Vest, M. D. *Bulletin of the Johns Hopkins Hospital, October, 1914, Vol. XXV, No. 284, page 305.*

The author presents a statistical study of 132 cases of primary carcinoma of the Fallopian tube, including four such cases from the gynecological department of the Johns Hopkins Hospital. His own cases are reported in detail and include microscopical examination of the tissue removed. The author draws the following conclusions from his study of this long series of cases.

Primary carcinoma of the tube, while not common, is not as rare as has been supposed, and its possibility must be considered when a tumor lateral to the uterus is present. There have been four such cases in the Gynecological Department of the Johns Hopkins Hospital.

Definite symptoms are not regularly associated with the tumor, but one or more of the following are usually present: a watery, often blood-tinged vaginal discharge; abdominal pain and induration on one side of the uterus; often a tumor is present. The discharge may be intermittent in character. Each tube is involved an equal number of times by the growth, while in about 28 per cent of the cases both tubes are involved.

If the condition is still confined to the tube a complete operation (hysterectomy, double salpingo-cophorectomy) should be done; otherwise only palliative measures can be employed. A careful macroscopic examination (and microscopic, if necessary,) should be made before the abdomen is closed of every tubal tumor removed. In some cases the

complete operation was done at a second laparotomy after the nature of the growth was discovered.

A microscopic examination should be made of a serohemorrhagic fluid obtained from a lateral tumor by pelvic puncture. Such a tumor should be considered malignant until proven otherwise.

Primary carcinoma of the tube may be present in association with an ovarian cyst.

The tumor is of a high grade of malignancy. At onset it may be of slow growth, but recurrence is soon noted after operation. In most cases the condition has been too far advanced for permanent relief when surgical aid was sought. Only four patients are known to be well five years after operation.

The Normal Differential Leucocyte Count.

Sydney R. Miller. *Bulletin of the Johns Hopkins Hospital, October, 1914, Vol. XXV, No. 284, page 317.*

The author was able to record the results obtained in making a large number of differential leucocyte counts upon medical students as a part of the routine work in the course in Clinical Microscopy at the Johns Hopkins Medical School.

From the analysis of his results he finds that

1. The total leucocyte count and differential formula in normal individuals are subject to relatively wide variations, which must be considered in the interpretation of studies made upon the bloods of individuals presumably suffering from abnormal conditions.

2. The interpretation of any differential count should be based upon:
   a. A knowledge of that particular individual's normal blood picture, when possible.
   b. The average values for the locality in which that individual resides.
   c. A consideration of those factors peculiar to the individual which might modify that particular blood.

3. Differential leucocyte counts should always be reported in terms both of percentage and absolute numbers per cubic millimeter, and in all cases, where possible, more than one differential count should be made, specially in borderline cases in which slight changes are to be regarded as of diagnostic or prognostic value.

4. The tendency to ascribe a diagnostic value to lymphocytosis is probably overdone. Only when the mononuclear elements constantly exceed the average percentage, absolute values and upper limits of variation (25-40 per cent) for the community and when all modifying factors are considered, should one attempt to draw valuable conclusions from the figures obtained.

A Review of Two Consecutive Operations for Goitre, with Especial Reference to the Treatment of Hyperthyroidism.

CHAS. H. FRAZIER. *Annals of Surgery*, November, 1914. Vol. L., No. 5, *page* 583.

This review is based upon a group of 103 consecutive operations of which there were 81 thyroidectomies, and 17 ligations of vessels, and 5 operations for thyroglossal cysts. Grouped histologically there were 34 simple goitres, 29 adenomata, 1 sarcoma, 2 carcinomata and 32 hyperplastic (exophthalmic) goitres. Of the thyroidectomies, there were no fatalities, save one in the case of a large vascular sarcoma in a boy of 11 years. Of the ligations there were 2 fatalities, who, according to our more enlightened conception of the limitations of surgical therapy, would be now regarded as inoperable, at least in the acute phase at which the operation was performed.

With regard to the treatment of various lesions of the thyroid gland, and particularly as to the propriety of operation, the author states that he presents the situation to the patient somewhat as follows: "That the operation is peculiarly free from danger, that the patient must decide for herself whether the swelling is enough of a personal annoyance to warrant its removal, that there is a tendency in a considerable number of cases for simple goitres to undergo certain changes which will affect the heart and nervous system, and eventually lead to permanent damage of the heart, kidneys, and liver; that in exceptional instances in later life goitres become cancerous." This, without doubt, is a fair presentation of the facts.

As to the risk of operation, there were no fatalities in the author's series of partial thyroidectomies.

As to the end results in the toxic cases, Frazier's reports corresponds with those from other clinics. Of the patients which he had heard from, ninety per cent had fully recovered or were greatly improved, and of the latter a number had been operated upon within one year.

The author finds that the completeness of the cure does not depend entirely upon the successful removal of the gland, but that two other factors must be considered. First, the care of the patients after the operation which should, whenever possible, free the patient from physical and nervous strain for periods varying from several months to two years. Unfortunately, the social status of the patient may make it impossible to provide these conditions sometimes. This must be borne in mind by the practitioner into whose hands the patient falls after operation, and the completeness of the recovery will depend upon his appreciation of the need of this after-treatment, and whether the circumstances permit of its enforcement. Second, the existence of chronic visceral disease at the time of the operation must be taken into account. Some of the patients are physical wrecks with organic lesions of heart, kidney, and other organs, from which complete recovery is impossible. As Kocher has said, if all cases were operated upon within a short

time after the outbreak of the disease, they would probably all be cured, and to this might be added that the mortality, low as it now is in all cases, would be reduced to that of as common a procedure as herniorrhaphy.

Finally in speaking of the attitude which the general practitioner should take in handling and advising these cases, Frazier states that if he so chooses he has the right to try nonsurgical means in the early stage of the disease before the myocardium or kidney or nervous system is permanently damaged. But if he fails to arrest the disease and does not advise operation in the curable stage, he should be just as severely censured as the practitioner who fails to call for surgical aid until his patient with acute appendicitis has developed peritonitis, or one with a callous ulcer of the stomach, carcinoma. The conditions are quite parallel. The extraordinary recuperative power of patients with Graves's disease is amazing, and in most cases, sick as they are at the time of operation, they will almost uniformly be restored to perfect or reasonably good health.

Experiences in the Treatment of Malignant Tumors by Radium.

Richard Sparmann. *Annals of Surgery, November,* 1914, *Vol. LX, No.* 5, *page* 567.

Dr. Sparmann, in writing from the clinic of Professor von Eiselsberg of Vienna, reports the experiences in the treatment of malignant tumors by radium in the General Hospital of Vienna. He reports that during a period of about nine months, 52 cases of inoperable malignant growths were treated. He emphasizes particularly that only inoperable cases were treated by radium because from the very beginning they were convinced that radium should not be used in any operable cases. They also have used radiation following an operation on tumors which were not radically removed. In every case the clinical diagnosis of malignant tumor was confirmed by histological examination.

They had at their disposal 225 mg. radium and 150 mg. mesothorium. This quantity was divided into fifteen applicators. These were applied partially externally and partially internally; in the latter case in the periphery of the tumor. They often reduced the tumor as much as possible before the irradiation, and also made use of cross fire. The filters were made of silver, gold, platinum, magnalium, and brass, or of rubber in various thicknesses.

At first they gave big doses up to 11,000 mg. hours at a time. In the last five months, however, they used at the most 1,200 to 2,000 mg. hours for one dose. The change was made because it was found that it had often such a great influence on the general condition of the patient, or that the radium destroyed the healthy tissues far beyond the limits of the tumor in too short a time. In every case the patients were given arsenic in the form of Fowler's solution to improve their general condition.

Their cases were divided into two series, the first of which received preventive and the second curative treatment. Of six treated in the first way, only one has remained free from recurrence. Among all the cases treated curatively as well as preventively, only 11 have remained free from tumors up to this time. Of these seven treated curatively were five cases of pithelioma cutis (basal zellencarc). One was a case of carcinoma linguæ, one a case of metastasis in the lymph-glands after sarcoma axillæ. Of the four treated preventively, three cases were carcinoma of the mucous membrane of the mouth, one sarcoma orbitæ. In six cases they noted improvement, 14 were aggravated and in five no effect could be seen during the period of treatment. Of these 17 cases 11 died of tumor, mostly of cachexia, one from hemorrhage, one of meningitis, one of old age, one of diabetes, and one of mediastinitis.

The author's conclusions are as follows:

From the above-mentioned results it is seen that radium is not a panacea for malignant tumors. Not only does it not always help, but it often even injures patients as well in regard to the local lesions as by its harmful effect upon the general condition, manifested by tachycardia with a pulse rate up to 120 and 140, dizziness, weakness, and vomiting. The latter has been observed especially after irradiation of the neck, probably due to iritation of the vagus. The local-ill-effect is especially marked in that the health tissues are badly injured so that we cannot prevent their further destruction. There is furthermore a great danger of causing a hemorrhage or perforating a hollow organ, such as the intestines. We had 11 hemorrhages among our cases, all of them lethal. Another case died of mediastinitis.

There is no such thing as elective effect. The tumor cell is not more easily destroyed because of the specific action of the radium itself, but being a degenerated cell, it is more susceptible to the effect of any trauma. We have seen only a greater susceptibility of the epithelium in contrast to the fibrous tissue.

As far as histological changes are concerned, I can only make the statement that there is no specific change in the tissues to be seen by radium irradiation. All we see is only necrosis and subsequent scar-formation, such as could be formed spontaneously in any tumor tissue.

Radium has only a local effect, therefore it can never take the place of an operation by which we can reach as far as possible all parts of tumor dissemination as by the Wertheim operation of cancer of the uterus, or by the operation of cancer of the breast with removal of the lymphatic glands. We have noticed in certain cases that during the treatment metastatic foci have been formed in lymphatic glands.

The indication for treatment by radium in the case of a growth which has attacked a vital organ must be the same as for an operation.

The hopes, therefore, we placed in radium as a new and successful means in the treatment of malignant tumors have not been realized. Moreover, the number of cases in which one might have recourse to radium therapeutics shrinks constantly as our experience progresses.

A Study of the Influence of Splenectomy and of Certain Organs and Organ Extracts on the Hemopsonins of the Blood Serum.

Howard T. Karsner, H. H. Amiral, and A. V. Bock. *Journal of Medical Research, July, 1914, Vol. XXX, No. 3, page 383.*

In the course of investigations of the relation of the spleen to blood changes and to jaundice Pearce and Austin (*Jour. Exper. Med.*, 1912, xvi, 780) found an increase in the number of endothelial cells of the lymph nodes and noted that most splenectomized dogs which succumbed to an injection of hemolytic immune serum within 48 hours showed much phagocytosis of red corpuscles by these cells and by the stellate cells of the liver capillaries. These observations suggested the possibility that in the absence of the spleen the function of producing endothelial cells phagocytic for erythrocytes, normally a function of the spleen and to a much less degree of the lymph nodes, becomes highly developed in the latter organs.

Accordingly the following study was carried out by the authors in order (1) to confirm Pearce and Austin's observations, (2) to study the hemopsonic content of the blood of normal dogs as compared with that of splenectomized dogs, (3) to study the hemopsonic content of the venous blood returning from various organs of the body, (4) to study the influence of various tissue extracts on hemopsonic activity, (5) to compare the effects on hemophagocytosis of extracts of the lymph nodes of normal and of splenectomized dogs.

From their series of experiments the authors draw the following conclusions:

1. Provided the spleen has been removed for a period of time less than a week and more than two days, the intravenous injection of a specific hemolytic immune serum, in doses large enough to produce hemoglobinuria, is followed by marked phagocytosis of erythrocytes by the endothelial cells of the lymph nodes and liver. In the lymph nodes the process starts about three hours after the injection of immune serum, reaches its height about 24 hours after the injection and is practically complete in 48 hours, when the endothelial cells are found to contain large quantities of pigment, presumably as the result of blood destruction.

2. A study of hemopsonins of the blood serum under the experimental conditions indicated in the text fails to show that the phagocytosis of erythrocytes, so prominent in the lymph nodes of the splenectomized animal following a fairly large intravenous dose of specific hemolytic immune serum, is dependent upon local or general variations in hemopsonin in the splenectomized animal or is influenced by organ extracts of normal and of splenectomized animals.

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The attention of physicians is called to the advantages which this institution offers in methods of laboratory diagnosis. Many physicians, through lack of time, technical training, or proper laboratory equipment, find it difficult to utilize the many methods of microscopical and chemical examination, so essential to proper diagnosis. To the Alumni of the Albany Medical School, and to physicians generally, the Bender Laboratory offers at a moderate cost, facilities for such examinations. Animal inoculation, chemical, bacteriological and histological examinations will be made as the case requires.

The following directions are appended for the benefit of those who may forward material:

All specimens should be accompanied by a brief note of the clinical condition and a special reference to the character of the examination desired. Name and address of person to whom report is to be sent should be clearly indicated.

1.—Pathological material from either operation or autopsy should be wrapped in moist gauze surrounded by oiled paper or rubber protective. When it is not possible for material to reach the laboratory within twenty-four hours, it should be placed in alcohol (80%) or formalin solution (10%). Small fragments of tissue and the material from uterine curettage should always be so preserved.

2.—Sputum should be sent in clean wide-mouth bottles; the ordinary vaseline bottle answers all purposes. The same bottle is suitable for faeces. Urine should be in clean bottles containing not less than six ounces.

3.—Exudates and other material requiring a bacteriological examination by culture should be placed in containers previously sterilized by heat (not chemical disinfectants).

4.—Outfits for special purposes, as diphtheria cultures, Widal reaction, etc., will be sent upon application.

5.—Tissues and fluids for animal inoculation, e. g., hydrophobia, tetanus, tuberculosis, etc., are best sent packed in ice. In cases of suspected hydrophobia it is advisable to send the entire animal without injury to the brain or cord.

6.—Haematological examinations at the patient's home will be made by appointment.

7.—The bacteriological examination of milk requires certain precautions in the collection of the sample. Special instructions and proper containers will be sent upon application. The same holds true for the collection of blood for the Wassermann-Noguchi reaction for syphilis.

8.—Members of the staff are at all times available for the purpose of conducting post-mortem examinations.

9.—For a chemical examination of milk from two to four ounces should be forwarded.

The fee for complete haematological examination at patient's home, $10.00; for post-mortem examination, $5.00 per hour of time consumed; for Wassermann-Noguchi reaction $10.00; for all other examinations, a uniform fee of $5.00. The charge for animal inoculation varies according to the character of the experiment. Under certain circumstances and upon request, these fees may be reduced.

Reports will be sent by telegraph if requested.

Letters and specimens should be addressed to

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LAKE AVENUE, ALBANY, N. Y.

ALBANY HOSPITAL

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